

# Machine and Tool BLUE BOOK

SERVING THE METAL WORKING INDUSTRY SINCE 1906

## SPECIAL FEATURES THIS MONTH

A special report on  
THREAD ROLLING

Tool Control

Developments in Diamonds

Abstracts of Papers Delivered  
at A.S.T.E. Show

Other items of interest listed on  
page 5.

MAY, 1950

A HITCHCOCK PUBLICATION



This is another of the  
"HUNDREDS OF JOBS"  
which can be done on a  
**MARVEL Band Saw!**

**MARVEL BAND SAW** saved these  
two 4400 lb. castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the \$64 question—how to machine out the  $1\frac{1}{2}$ " slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of  $6\frac{1}{2}$ ".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly and economically, without special tooling, on a standard Model No. 8M 2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of \$3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

**WRITE FOR CATALOG**

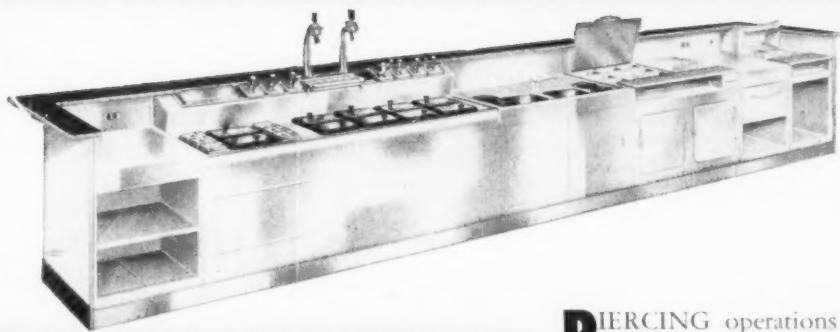
**ARMSTRONG-BLUM MFG. CO.**

5700 Bloomingdale Ave., Chicago 39, Illinois

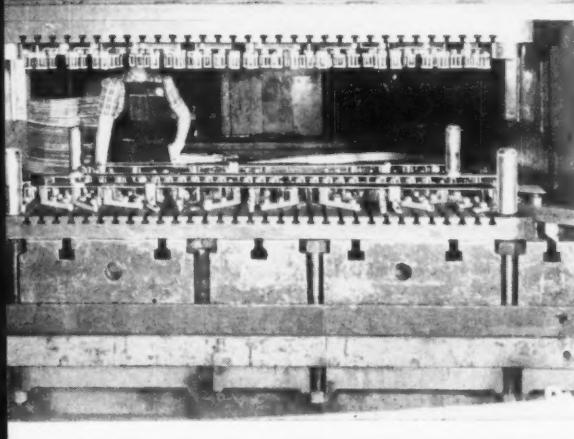


 **MARVEL** Metal Cutting  
SAWS.  
Better Machines—Better Blades

INCREASE PRODUCTION EFFICIENCY WITH WHISTLER ADJUSTABLE DIES



# HOLES PIERCED SIMPLE, FAST AND ECONOMICAL...



If you're interested in getting more production at less cost in your perforating operations, get the facts on Whistler Adjustable Dies. They're used by over 1000 leading manufacturers. Write for your catalog today.

PIERCING operations necessary in producing a 22' Fountain layout are no problem when Whistler Adjustable Dies are used. Set-ups for perforating, notching, slotting and rounding take less time. Precision is assured on long and short runs. Changes can be made without tying up press production.

The real savings are in the continued re-use of the same dies on different jobs. Punch and die units can be rearranged. New sizes or shapes can be added. The heavy duty units easily pierce materials up to and including  $\frac{1}{4}$ " mild steel.

The new HU-50 Perforating unit that pierces at  $90^\circ$  angle can be used in the same set-up with other Whistler perforating dies.

S. B. WHISTLER & SONS, INC.  
760 Military Road, Buffalo 17, N. Y.

Typical press set-up of Whistler Adjustable Dies simplifies complicated piercing pattern.



**1 + 1 = 1**

**LOOKS QUEER?**

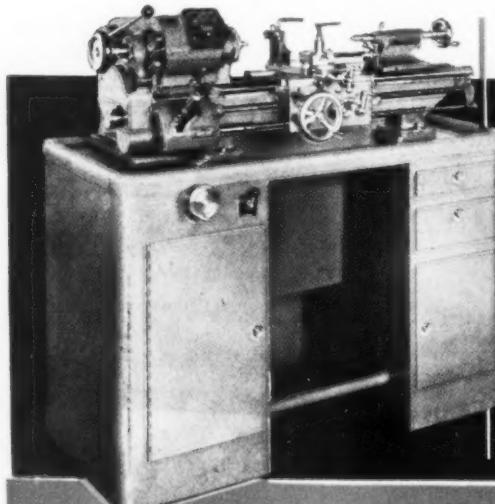
**Not when it refers to obsolete lathes compared to  
the Wade 8A. ONE 20-year-old lathe plus ONE 20-year-  
old lathe equals**

**ONE WADE No. 8A LATHE!**

You can prove this in your own shop, because this fine precision lathe is **twice** as productive as any lathe bought twenty years ago. It has several features you would never expect to find on a lathe of this size — enabling you to perform certain operations usually requiring larger equipment.

The No. 8A is an extremely versatile lathe, carefully designed and ruggedly built for many years of precision work. So, if you're interested in **cutting costs** and **increasing production** you need this modern tool.

**Send for the "8A Bulletin"** and learn how these new features will give you the **UPPER HAND ON PRODUCTION!**



**VARIABLE SPEED DRIVE  
ELECTRIC TACHOMETER  
FOOL-PROOF CLUTCH  
AMPLE TORQUE  
REAR STATION TOOL BLOCK  
AMPLE FRONT GUIDEWAY  
THREAD-LOCK SPINDLE NOSE  
FULL-BEARING TAILSTOCK  
COMPLETE ELECTRICAL SYSTEM**

**Swing over Bed                    8½"  
Distance between Centers      24"  
Collet Capacity                  1"  
Taper Standard for Centers No. 2 Morse.  
Tailstock Spindle Travel        3¼"  
Tool Shank Section              ¾" x ¾"**

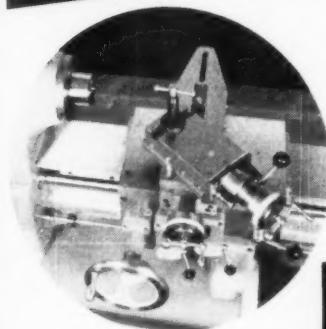
**THE Wade TOOL CO., 51 River St., Waltham, Mass.**

**HARDINGE**  
ELMIRA, N.Y.

## "THE MODERN TOOL ROOM LATHE"

with the

### FULL BEARING CARRIAGE

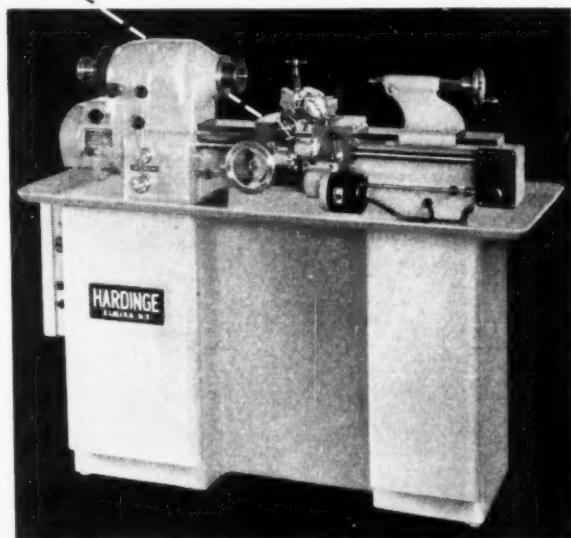


**Model HL HARDINGE  
TOOL ROOM LATHE**

Put this modern machine to work in your tool room — for your profit.

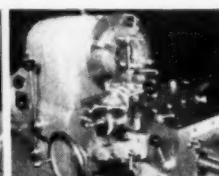
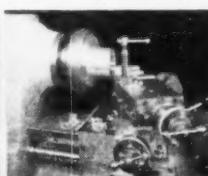
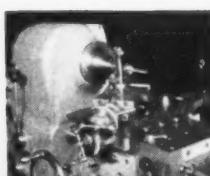
Design incorporates all features for high speed operation and extreme accuracy to cut your costs.

This low-cost machine will free larger tool room machines for large work, thereby giving added capacity on the most economical basis.



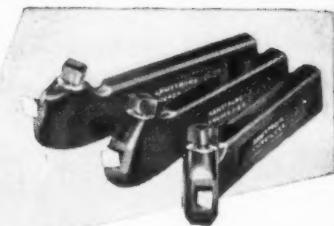
#### OTHER FEATURES:

- Precision Gear Box for Threading Only
- Independent Variable Electric Feed for Carriage and Cross Slide
- Preloaded Ball Bearing Spindle Construction
- Easy Reading Black-and-White Feed Screw Dials



**HARDINGE BROTHERS, INC., ELMIRA, N. Y.**

# ARMSTRONG TOOL HOLDERS



*answer both . . .*

1. *The problem of lowering costs*
2. *The problem of increasing output*

By providing permanent, multi-purpose, inexpensive ARMSTRONG TOOL HOLDERS that use cutters or bits that are quickly ground from standard high speed shapes (Saving: All Forging, 70% Grinding and 90% High Speed Steel), the Armstrong System of Tool Holders will reduce your tool cost to an absolute minimum.

By providing stronger, more efficient tools, carefully developed for each operation, as well as ARMSTRONG High Speed Steel, ARMALOY Cast Alloy Cutter Bits or Armide Carbide-Tipped Cutters as required for each job, ARMSTRONG TOOL HOLDERS permit greatly increased speeds and feeds, enable you to increase the hourly output of every lathe, planer, slotted, shaper, turret lathe and screw machine.

There is no surer way to lower costs and increase output, than to use the correct ARMSTRONG TOOL HOLDER for each operation on all machines.

## ARMSTRONG BROS. TOOL CO.

*"The Tool Holder People"*

5208 W. Armstrong Ave. Chicago 30, U.S.A.

Eastern Warehouse and Sales: 199 Lafayette St., N. Y. 12, N. Y.  
Pacific Coast Whse. & Sales Office: 1275 Mission St., San Francisco 3, Calif.





# Blue Book Contents

Published Monthly

Vol. 46 No. 5

MAY 1950

## Special Report on THREAD ROLLING

**Wm. F. Schleicher**  
Editor

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New Equipment Editor

**Gerald E. Stedman**  
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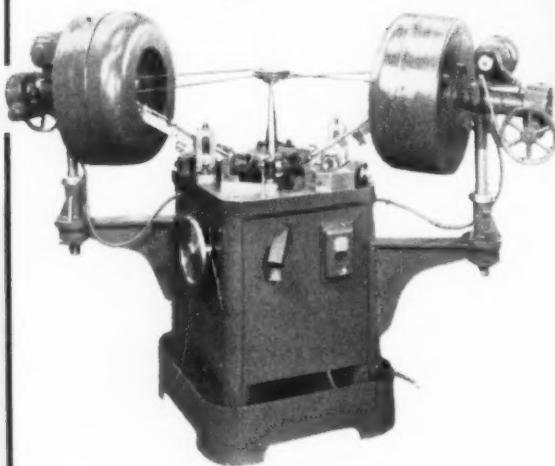
Pacific Coast: Fred Frisenfeldt, 1250 Wilshire Blvd., Los Angeles 17, Calif. Phone: Tucker 6703

Acceptance under section 34.64, P. L. and R. authorized. (Office of Publication, De Kalb, Illinois.)



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# *The Rollmaster*



**FOR ACCURATE  
THREAD ROLLING**

Another PRUTTON advanced Model Automatic Machine designed for accurate thread rolling, which meets the enormous planned production schedules necessary in industry today (better than 25,000 pieces per hour).

Rotary in design, THE PRUTTON ROLL MASTER can be easily operated by unskilled workmen.

*Write today for full particulars.*

**TAP IT WITH A  
PRUTTON**

*Tapmaster*

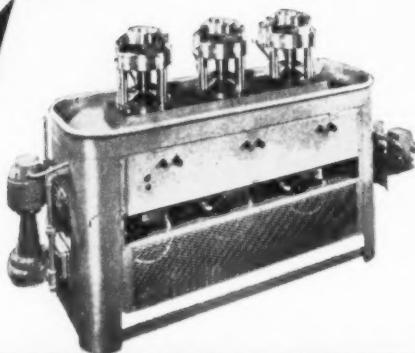
**3 TAPPING MACHINES IN 1**

The Tapmaster Line handles a complete range of work up to 4".

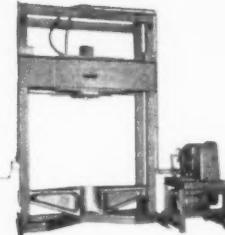
Production figures vary from 500 to 1500, depending on the type of work to be tapped.

Also available for heavy duty work is the No. 40 Tapmaster. This machine is designed for collapsible tap work up to 4".

*Write today for descriptive bulletin.*



**D. H. PRUTTON MACHINE & TOOL CO.**  
**5295 W. 130th St.** **CLEVELAND 11, OHIO**



SPECIAL 150 Ton Open Yoke Vertical Press with adjustable head member and double-acting cylinder.

. . . THE FINEST PRESSES  
FOR THOSE 101 SHOP JOBS

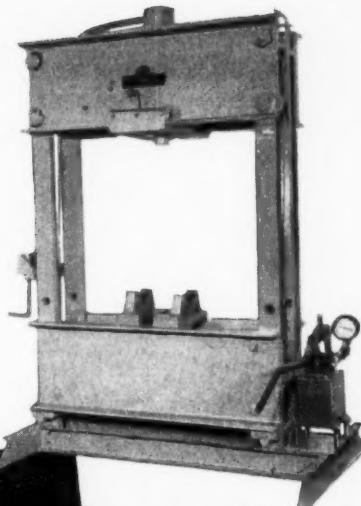


**Fast, Versatile Hydraulic Presses  
With Hand or Power-Driven Pumps**

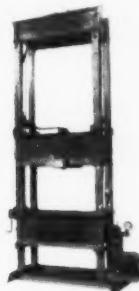
Here are versatile, time-saving presses you can use in a hundred ways—the Rodgers 150 and 200 Ton Hydraulic Shop Presses, operated with your choice of new 4-speed Hand Pump or Power Pump.

The standard 150 and 200 Ton Units include many construction and operating features, outlined in our new catalog. If specifications on the standard models don't meet your requirements, we'll modify them or build a special press as required.

There are standard model Rodgers Shop Presses in 60, 80, 100, 150, 200, 300 and 400 Ton Capacities!



STANDARD 150 Ton Shop Press with new Rodgers 4-speed Hand Pump.



SPECIAL 150 Ton Shop Press featuring a 96" opening with adjustable head and bolster.

**SEND for CATALOG . . .**  
New Catalog 313 has descriptions and specifications on the complete line of shop presses.

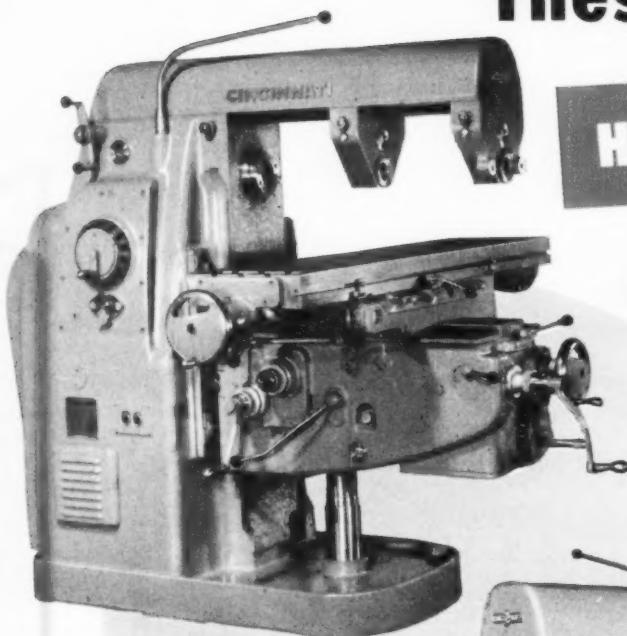


**Rodgers Hydraulic, Inc.**

7453 Walker St., St. Louis Park, Minneapolis 16, Minn.

**HYDRAULIC POWER EQUIPMENT**

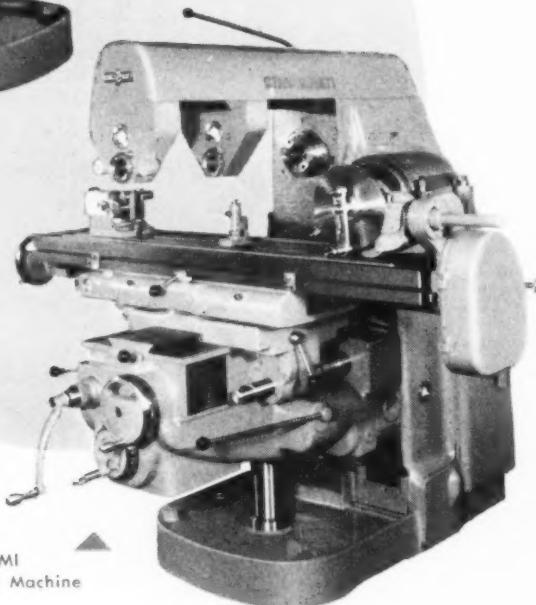
# These New



HELP YOU



CINCINNATI No. 3MI  
Plain Milling Machine



CINCINNATI No. 3MI  
Universal Milling Machine



# Cincinnatis

## MEET SHARP COMPETITION

Earnings are allergic to almost everything. For one, they shrink before the keen edge of competition. It's up to you to see that they maintain a healthy, well-rounded figure, and one way to do this is to replace old equipment with new machine tools which operate at lower costs. ¶Take a look at your No. 3 size milling machines, for example, especially those over 10 years

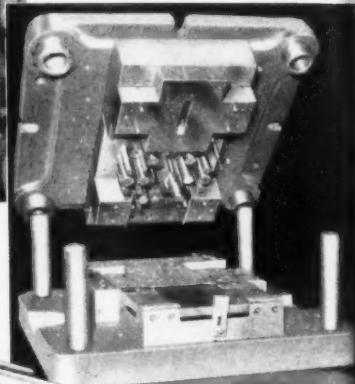
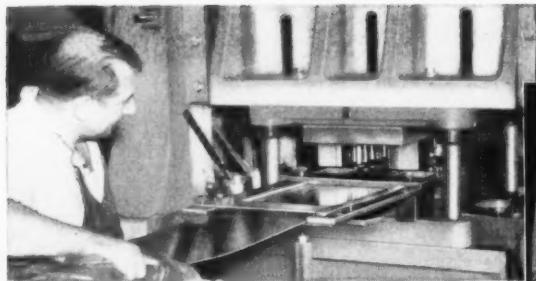
old. Then work out the mathematics of investment return, old No. 3 machines compared to new CINCINNATI No. 3MI's. In most cases, you'll find that it's an unwarranted expense to continue operation of your old No. 3's. The new CINCINNATI No. 3MI will do the same job better, and at lower cost. ¶Our field engineers are at your service to help you decide upon replacement machines.

CINCINNATI No. 3MI Milling Machines are built in plain and universal styles. Ranges: 34" longitudinal, 12" cross and 20" vertical (19" for universal style). 7½ hp drive. Complete rear operating controls, 150" per minute power rapid traverse to table, and Dynapoise overarm included as standard equipment. Catalog No. M-1700.

THE CINCINNATI MILLING MACHINE CO.  
CINCINNATI 9, OHIO

# Cincinnati

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES  
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID



**4000  
PER DAY**

28,000 STAMPING OPERATIONS WITH

# **PRODUCTO DIE SET AND PROGRESSIVE DIE**

With the use of a Producto 4 Post Die Set and modern die design, the Trumbull Electric Manufacturing Co. has stepped up production, increased accuracy and cut unit costs. The operations of this particular die include...cut box corners, pierce holes, cut knockouts, bend, form welding projections, set back knockouts, and cut off. (One other operation finishes box forming.)

*Material:* Coiled 10-9/16 x 16 ga. C.R. steel is hand fed to die from automatic coil cradle. *Tolerances* of  $\pm .005$  are held in some cases, and slightly higher on other operations. *Die size:* 23-3/4" x 18". *Press:* 160 ton Bliss.

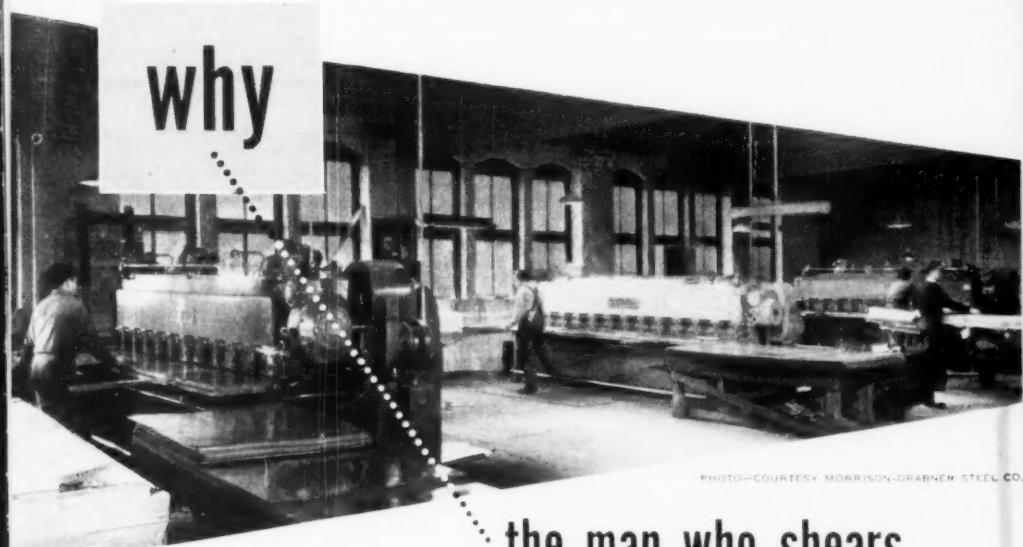
Through the complete manufacturing cycle Producto Standard and Special Die Sets are held to the strict requirements established for every phase of machining. When your set is ordered from "Near Neighbor Service," there's no lost motion...no red tape. Shipment is fast...plus values built into your sets assure long, low-cost service life. Specify PRODUCTO.

## *"Near Neighbor" SERVICE*

Call "Producto" in Classified Telephone Directory in major stamping centers. Fast service thru 26 Producto representatives.

**THE PRODUCTO MACHINE COMPANY**

960 Housatonic Avenue, Bridgeport 1, Conn., Tel. 4-9481



PHOTO—COURTESY MORRISON-BRABNER STEEL CO.

## the man who shears for a living uses Cincinnati Shears!

He gets a quick and satisfactory return on investment—many a Cincinnati Shear has totally paid for itself in less than a year.

Cincinnati Shears produce accurate blanks without costly dies or special setups—cut production costs to the

bone. They satisfy a critical trade and promote business.

The machine tool like accuracy, the rapid gauging, the ability to shear quickly and satisfactorily make the Cincinnati All-Steel Shear a profitable machine in any shop.

*Write for Catalog S-5, illustrating Cincinnati All-Steel Shears.*



**THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO U.S.A.  
SHAPERS • SHEARS • BRAKES

**PROFIT**  
Proof of the Padding is in the Eatin

*When you do it with  
**MULTIPRESS\***  
- you do it for LESS*

There may be a cost-cutting tip here for you, even if your production jobs vary widely from those at right. For these typical case records are simply *more proof* that, for an amazing range of jobs in nearly every industry, Multipress is the most efficient, production-speeding, low-cost answer available.

The reason for this is the way Multipress applies the oil-smooth accuracy of modern hydraulic power. Its advanced valving and design permits safe, easy operation at *high production speeds*, plus space-saving compactness, and ready adjustability to an extremely wide range of production needs. Some of these advantages are due to complex engineering details, but their effect is easily seen in results obtained on hundreds of production lines.

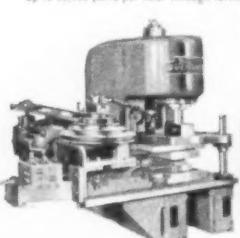
Multipress is available in a complete range of frame sizes, in capacities from 1 to 35 tons. A choice of widely interchangeable controls, operating features, accessories and attachments make it easy to tailor these standard units to your exact needs—at low cost. Let us send you further details. Write today.

*Have you seen our MOVIE*  
... showing Multipress in action on many types of production lines? Your inquiry is invited.

**The DENISON Engineering Co.**  
1184 Dublin Road, Columbus 16, Ohio

With harmonic stock feed accessory, the Multipress at left processes up to 50,000 parts per hour through forming, drawing or punching die.

For faster, safer, better  
FORGING, SLOTTING,  
ASSEMBLING, CRIMPING,  
STAKING, RIVETING,  
TRIMMING and scores of other production tasks, Multipress is your cost cutting answer!



**DENISON**  
HydroOiles



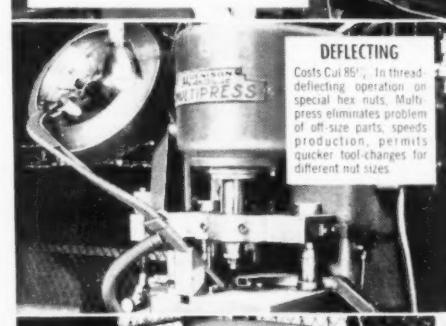
**CRIMPING**

2½ Times Old Rate! Accurate power control of Multipress ends breakage of ceramic insulators as thin metal electrode tubes are crimped on. Also increases production 150%.



**PRESSING, CRIMPING, RIVETING**

Rejects Slashed. A dozen Multipress units bring new speed and economy to several different operations in the assembly of automobile door locks. User likes quiet, safe, low cost operation.



**DEFLECTING**

Costs Cut 85%. In thread-deflecting operation on special hex nuts, Multipress eliminates problem of off-size parts, speeds production, permits quicker tool-changes for different nut sizes.



**STAKING, CRIMPING, PRESSING**

Production Doubled. Better control of ram action and pressure cuts rejects, lowers cost and speeds production, reports leading radio maker who uses Multipress several ways.



**"SLASH YOUR SET-UP TIME"**

WITH THE

**TREE**

**TAPER BORING TOOL**

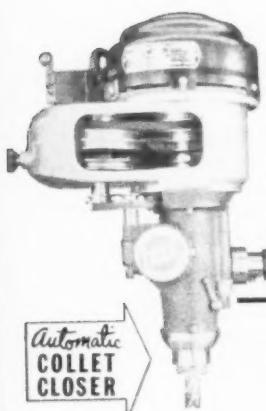
Cut expensive set-up time from hours to a few minutes with the revolutionary TREE taper boring tool. You can use it on your present milling machine, jig borer or boring bar. Write today for complete information. In addition to boring taper holes this tool can be used for —



- \* Straight boring . . . as shown at left used as offset boring tool.
- \* Facing . . . up to 10" in diameter.
- \* Outside Turning . . . either straight or tapered up to 8" with extension bar.



Free Literature  
On Request



### **TREE UNIVERSAL MILLING HEAD ATTACHMENT . . .**

All Angle Milling, Drilling & Boring.  
Compact Design,  $\frac{3}{4}$ " Collet Capacity.  
4" Quill Travel. Power Feed Eight  
Speeds—  
140-3500 RPM or 210-5200 RPM. Hardened  
& Ground Spindle & Quill. Enclosed  
Micrometer. Depth Stop.

For Full Information — Write Dept. B

**TREE TOOL and DIE WORKS**

1600 JUNCTION AVE. • RACINE, WISCONSIN

# RED-E LIVE CENTERS



. . . Like this 600 pound giant that incorporates seven sets of bearings, including shock absorbing mechanism that assures protection for the load carried — built for a 200,000 pound turbine rotor shaft; will meet your every conceivable special application.

★ Effective cost reduction performance can only result when your Ball Bearing Center is engineered to conform with your specific needs.

★ Before you buy—send for the RED-E Tool "7 Points of Superiority" Chart. Let RED-E give you detailed specifications and prices for the Center certified for your job.

CENTER SPECIALISTS SINCE 1908



THE READY TOOL COMPANY  
550 Iranistan Ave., Bridgeport 5, Conn.

*It costs no more to have the best...*



Socket for Zerk Grease Fittings

## SOCKETS & WRENCHES

For real production tool economy, look well beyond the original tool costs. The "savings" made on lower first costs can be quickly dissipated—many times over—through losses in production time...caused by quick wear-out and tool breakage.

For real production tool economy, look to Apex sockets and wrenches. Precision-machined from high carbon, electric furnace alloy steel, cold broached and heat treated to withstand strains and shocks, Apex production socket wrenches are designed and built for continuous, heavy-duty service.

For real production tool economy, fill your socket wrench requirements from the thousands of standard types and sizes available for immediate delivery from complete Apex stocks. For special applications, just send sketch or blueprint—we'll furnish quotations promptly, without obligation. Catalog 19 lists thousands of plain and universal sockets, extensions, adapters . . . write, on your company letterhead, please, for your copy.



Universal Socket Wrench with Tension Sleeve



Extension Socket Adapter



Driver for Socket Screw



Universal Socket

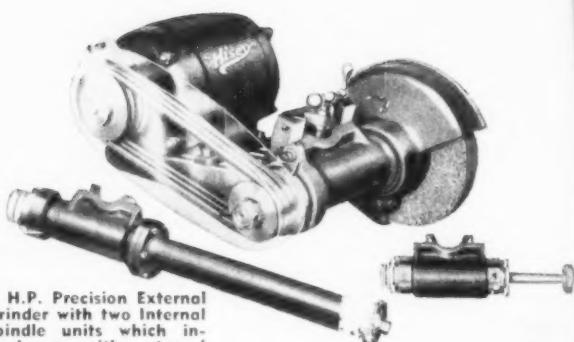
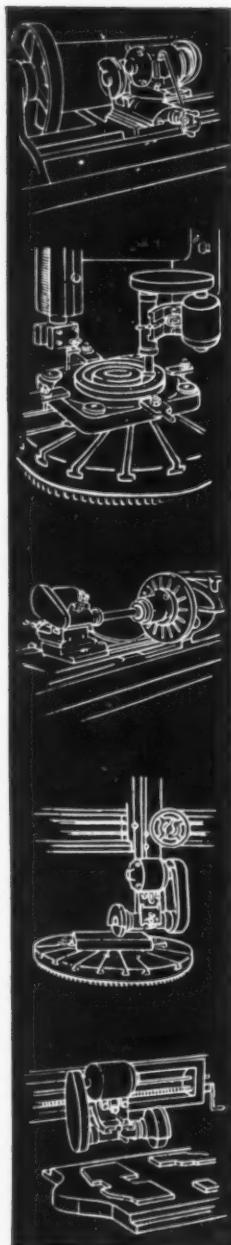


## sockets and wrenches

THE APEX MACHINE & TOOL COMPANY

1028 S. Patterson Blvd. • Dayton 2, Ohio

Safety Friction Tapping Chucks • Vertical Float Tapping Chucks • Self-Releasing and Adjustable Stud Setters  
Power Bits for Phillips, Frearson, Slotted Head, Clutch Head, Hex Head and Socket Screws • Hand Drivers  
for Phillips, Frearson and Clutch Head Screws • Aircraft and Industrial Universal Joints • Sockets and Universal  
Joint Socket Wrenches.



**3 H.P. Precision External  
Grinder with two Internal  
Spindle units which in-  
terchange with external  
spindle.**

## **for Precision Grinding Internal External Surface!**

These HISEY Wide Range Precision Grinders can be mounted on lathes, planers, boring mills, milling machines and other machine tools for all sorts of internal, external and surface grinding operations. Rigid construction throughout insures accuracy for production as well as tool room operations.

Spindle units have dove tail slide and internal and external spindles are quickly interchanged. V-Belt drive provides correct speed for all kinds and sizes of grinding wheels.

Bases have large flat plates with bolt slots to facilitate mounting on the regular tool holding fixtures of the machine tool. Constant speed motors are used throughout providing uniform wheel speed for better grinding results.

*Made in sizes from  $\frac{1}{4}$  H.P.  
to 10 H.P. capacity.*

Other "HISEY" Products: Bench and Pedestal Grinders and Buffers, Snagging Grinders, Tool Post Grinders, Wet Tool Grinders, Disc Grinders and Drill Grinders.

**ASK FOR COMPLETE CATALOG 71 BB**

**Hisey** THE HISEY-WOLF MACHINE CO.  
CINCINNATI 8, OHIO  
Division of The Cincinnati Electrical Tool Co.

# *Are you troubled with "THREADACHES" in your Tapping Operations?*

Here's Your Prescription—



For immediate relief apply HY-PRO Taps with correct speed, feed and lubrication. Continue this treatment for complete cure. More accurately threaded holes will result, and your assembled parts can be fastened tighter and stronger to resist vibration.

FOR CASES OF CHRONIC "THREADACHES" Send complete symptoms in detail to our specialist in the Engineering Department. A thorough diagnosis will be made, and a treatment prescribed when all tests in the physical laboratory prove it will provide a cure.

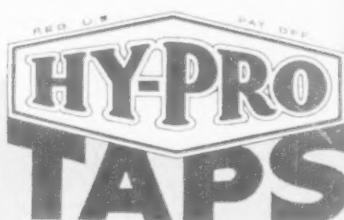
All HY-PRO Taps last longer on the job and yet longer between sharpenings to assure Sustained Accuracy — the true guide to tap efficiency and economy.



ORDER THRU YOUR DISTRIBUTOR

**HY-PRO TOOL CO.**

A Subsidiary  
Continental Screw Co.



New Bedford, Mass., U.S.A.

*"NO MATTER  
HOW YOU LOOK AT IT..."*



THE  
**HERZBERG**  
MULTIPLE  
DRILLING  
and  
TAPPING  
HEAD  
is your  
answer to  
**PRODUCTION**  
**PROBLEMS**

You naturally are looking for a way to cut production costs with economy and efficiency.

The Herzberg is fully mechanized with positive gear drives on each spindle, the precision location of these spindles does not depend upon the operator's locating holes to be drilled or tapped — complete change over time is cut to the barest minimum.

Investigate the possibilities of how the Herzberg Head can improve your production schedule.

Please send for our folders and get the complete information.



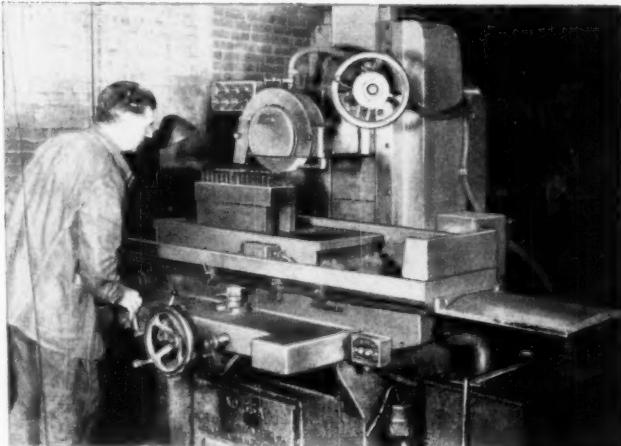
**Herzberg** CORPORATION

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# Enthusiastic Customers do our BEST advertising

True Temper Corporation, manufacturers of True Temper Products, use fourteen Grand Rapids Hydraulic Feed Surface Grinders in ten of their factories. The machine shown is a 55A.



You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

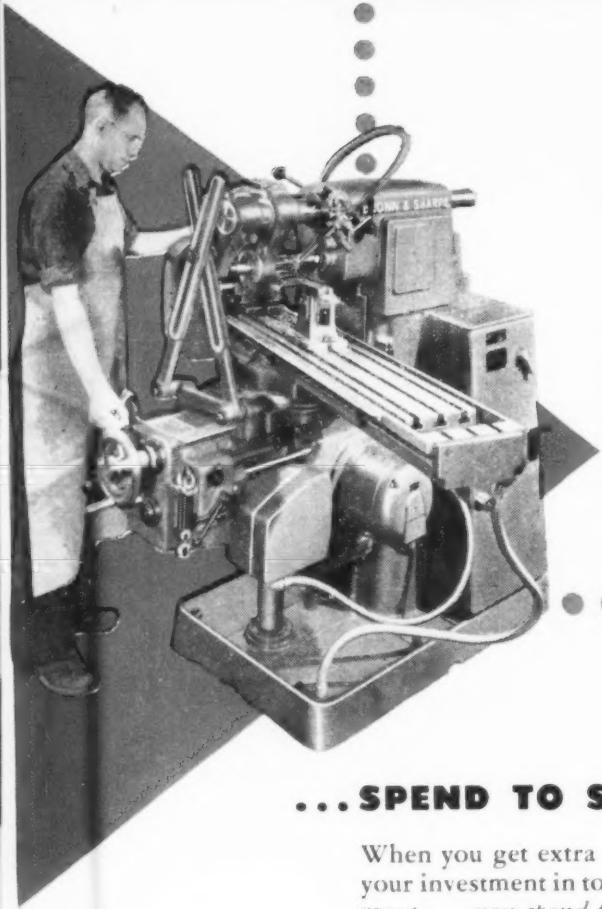
*to serve you -*

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.



**GRAND RAPIDS GRINDERS**

405 Straight, S. W., Grand Rapids 4, Mich.



Look to  
the future  
when you buy  
•••for the present•

**...SPEND TO SAVE**

When you get extra returns, *far into the future*, on your investment in today's machine tools and equipment . . . you *spend to save!* You gain not only immediate advantages . . . simplified operation, high accuracy and convenient versatility . . . but also an extremely long productive life. These are the recognized advantages of Brown & Sharpe precision-built machines . . . highly profitable to industry the world over. Compete information about any machine sent on request. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

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## MILLING MACHINES

**Universal**

**Plain (including manufacturing type)**

**Vertical**

## GRINDING MACHINES

**Universal**

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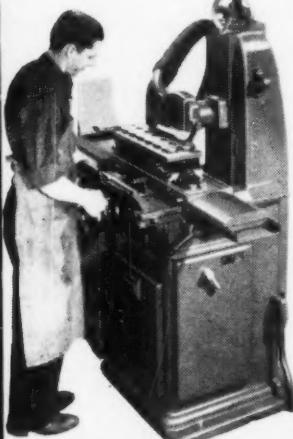
**Cutter and Tool**

## SCREW MACHINES

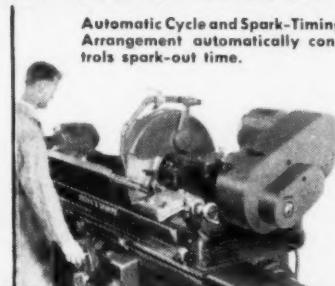
**Automatic (including screw threading,  
pinion turning and cutting-off types)**

**Wire Feed**

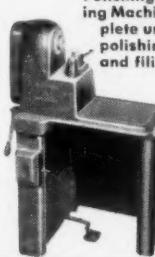
### RECENT MACHINE TOOL DEVELOPMENTS



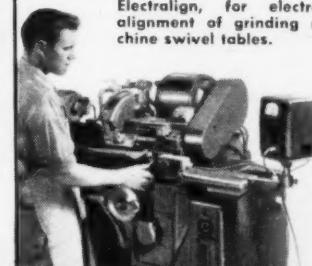
**2L and 2LB Surface Grinding Machines**—automatically lubricated—for trouble-free, precision surface grinding under extra dusty or severe operating conditions.



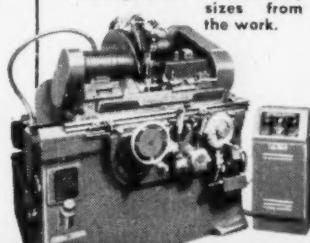
**Automatic Cycle and Spark-Timing Arrangement** automatically controls spark-out time.



**Polishing and Finishing Machine**—a complete unit for faster polishing, burring and filing.



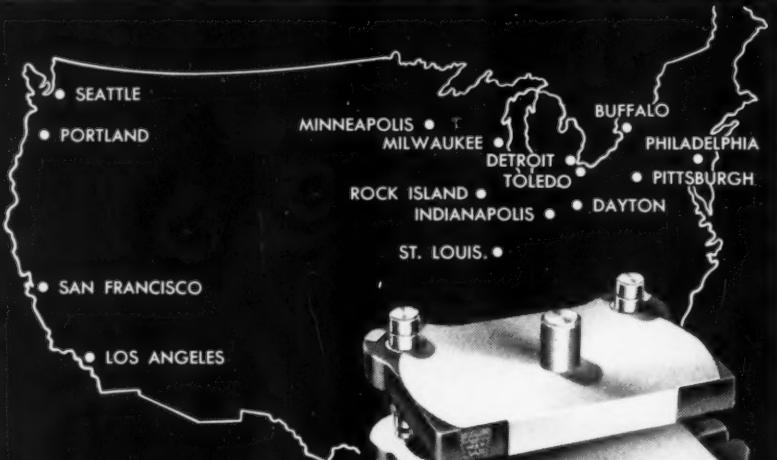
**Electralign**, for electronic alignment of grinding machine swivel tables.



**Automatic Cycle and Sizing Arrangement** automatically sizes from the work.

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*Representation  
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Micro-metric jig-bored die sets in commercial or precision grades are available to you through the DETROIT DIE SET representative in your community. Phone or write for prompt delivery of standard and special die sets and high-precision die maker's supplies.

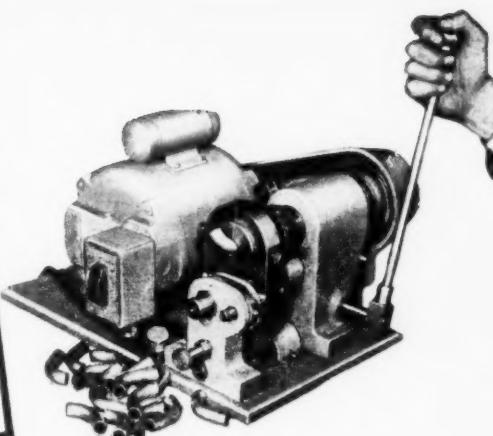
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**DETROIT DIE SET CORPORATION**  
2895 W. GRAND BLVD. • DETROIT 2, MICHIGAN

**DETROIT  
DIE SETS \***

# New PINES Tube & Rod END-FINISHING MACHINE SPEEDS WORK OUTPUT



**Completes 500 to 1,000 Pieces Per Hour**

A broad range of end-finishing operations can now be handled with speed and precision on this new Pines bench-type end-finishing machine. It embodies a new type mechanical chuck and chuck closing mechanism that cuts production time. Jaws are arranged for interchangeable split-type inserts to accommodate any length tube, pipe or rod.

## Profitable Uses

- Deburring
- Inside and Outside Chamfering
- Facing
- Center Drilling
- Drilling
- Reaming
- Single Point Boring
- Light Forming
- Turning

## Brief Specifications

**Capacity:** Up to 2" diameter—any length.

**Cutters:** 3 adjustable —4 to cover range.

**Motor:**  $\frac{1}{2}$  h.p. with step sheave.

**Weight:** 170 lbs.

## 3 Operations in 1 Motion of Handle

One movement of the operating handle quickly clamps the workpiece, removes the stock stop, and feeds the cutter to the work. Release of the handle returns the chuck to its original position and simultaneously unclamps the piece. Thus, with one hand free for loading the machine, an operator can speed work output.

**For long-run work,** there's a fully automatic Pines Model with foot-control to help you save additional time. Models up to 5" capacity are also available.

## Write for free bulletin

Get more facts today on this new, time-saving production tool. Find out how it will help you save time on your work.

PINES ENGINEERING CO., INC.  
AURORA, ILLINOIS

BENDING      PROFILING      CUT-OFF      CENTERING

**PINES** ENGINEERING CO., INC.  
Specialists in Tube Fabricating Equipment  
692 WALNUT      AURORA, ILLINOIS

## TAPPING TECHNIQUES No. 6



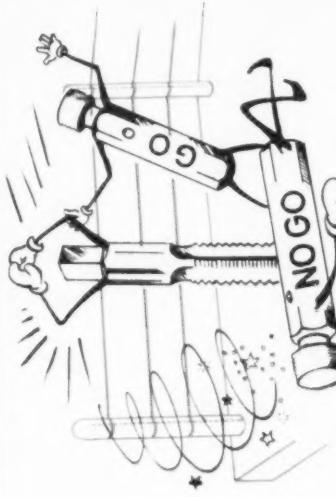
You tapped the hell of a dizzy "jane  
A bit off-center with your wobbly cane



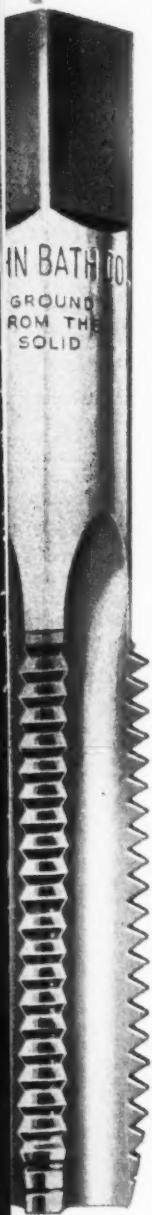
Remember when you were a "gay young blade"—  
What a difference some extra cash always made?



When a tap is "cocked"—or a bit out of line  
Your production of bell-mouth holes'll be fine!



Just use care in alignment . . . a holder that's true  
And Bath taps'll make perfect threads for you!



## INSIST ON BATH TAPS . . . PROFIT BY THEIR PLUS-PERFORMANCE

Bath Taps are precision cutting tools. They are ground from the solid after hardening to maintain accuracy. Give Bath Taps the same care and consideration you give any precision cutting tool and you'll get TOP PERFORMANCE. To avoid bell-mouth holes we recommend reasonable care in the alignment of a true running Bath Tap with the hole — which will consistently produce quality threads and will increase tap life. If you are having "threading troubles" — call your nearest BATH representative or write direct for engineering assistance.

PLUG AND RING THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS

**JOHN BATH CO.** INCORPORATED  
14 Grafton St., Worcester, Mass.



# Our First Forty Years..

We are celebrating our Fortieth Anniversary this year with some pride of accomplishment and with a good deal of gratitude to the people who have made this possible.

These include our thousands of friends throughout North America and beyond who have bought our diamonds and diamond products; our many suppliers whose cooperation is so essential, and our company "family" of workers in our several plants and field offices who make, distribute, and service our products.

We have seen this family grow from our original group of three beginners to an organization of nearly two hundred including many outstanding specialists. And, with them, we have graduated through the years from an unheated garage (with practically no equipment) to the most modern of plants and the finest of equipment, much of it exclusive.

Together, we have seen the diamond tool changed from a primitive, handy-man product to a thoroughly scientific tool "engineered to the job" in accordance with the principle which we pioneered forty years ago and developed into recognition throughout industry.

To all of these friends—customers, suppliers, co-workers—our sincere thanks.

WHEEL TRUEING TOOL COMPANY

*Harry D. Wallace*  
President



ROBERT S. FOWLER  
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PATRICK ADAMS  
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1950



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and Bits for Oil Field Drilling  
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Radius Forming Diamond Tools  
Diamond Tools for Thread Dressing  
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Special Diamond Tools

## WHEEL TRUEING TOOL COMPANY

3200 West Davison Avenue

Detroit 6, Michigan

Established 1910

WHEEL TRUEING TOOL CO. OF CANADA, LTD.  
575 Langlois Avenue  
Windsor, Ontario, Canada

THE ADAMANT TOOL COMPANY  
(Eastern Division of the Wheel Trueing Tool Co.)  
33 West Street, Bloomfield, N. J.

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KARL J. Klapka  
Field Engineer  
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LEO CATALLO  
Superintendent  
Diamond Drilling Div.



TAD BEMBEN  
Plant Engineer



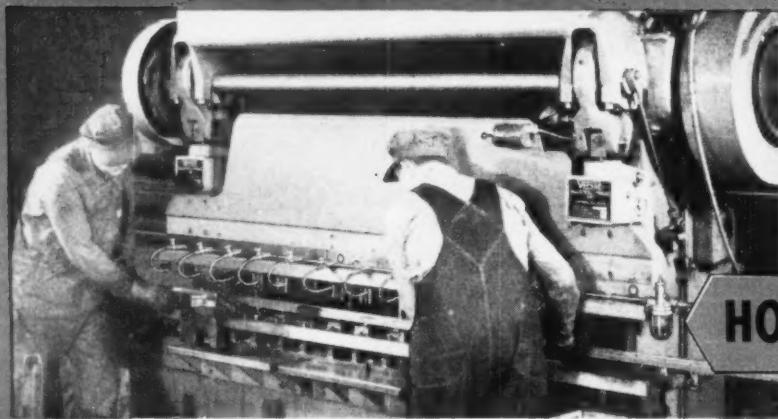
ROBERT F. KENNEDY  
Supervision  
Diamond Setting



LARRY CARTER  
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Diamond Sorting

# 30% BOOST IN PUNCH PRESS OUTPUT

Punch tool life INCREASED 50%...



See our Exhibit  
Booth 635  
A.S.T.E. Show



**Sunlight Metal Products Corp.** — Denver manufacturer of quality steel sash—did the trick! Upon the advice of a Norgren representative, they installed a Norgren Oil Fog Lubricator and a simple distribution system on a punch press—to lubricate **automatically** each punch and stripper unit for **every stroke**. Previously, the punches were lubricated by hand with a brush only once in every ten strokes.

Here's a tip for machine designers and users to give their equipment more output and less upkeep by the simple and logical installation of Norgren Automatic Oil Fog Lubricator:

## NORGREN LUBRICATORS...are 'way out front!'

- Automatic—no attention except refilling.
- Develop an airborne Oil Fog that coats every moving part reached by air.
- Visible oil feed and (transparent bowl types) visible oil supply.
- Accurate needle-valve control of oil flow.
- Ball check hold oil in position for intermittent use, assuring oil feed the instant air flows.
- Stop oil waste; lubricate only when air flows.
- Check wear of tool or equipment in use; stop corrosion when idle.
- Compact, easy to install.

WRITE C. A. NORGREN CO.  
238 SANTA FE DRIVE  
DENVER 9, COLORADO

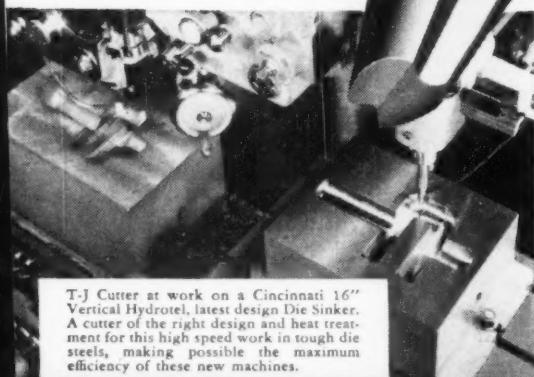
*Norgren*

Also Filter  
Regulators, Valve  
Hose Assemblies

Turn out **MORE WORK**  
between grinds with

# T-J CUTTERS!

*Less breakage...  
Lower Cost!*



T-J Cutter at work on a Cincinnati 16" Vertical Hydrotel, latest design Die Sinker. A cutter of the right design and heat treatment for this high speed work in tough die steels, making possible the maximum efficiency of these new machines.



Your die costs go down . . . and you can raise the feed . . . using T-J Die Sinking Milling Cutters! Their advanced design helps you get utmost accuracy, speed and efficiency from your machines. T-J cutters made from a standard, extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. They're extra rugged . . . hold a sharp edge longer . . . less breakage! Wide range of T-J standard styles and sizes. Send for new catalog 150. The Tomkins-Johnson Co., Jackson, Michigan.

**TOMKINS-JOHNSON**  
DIE SINKING MILLING CUTTERS



33 YEARS EXPERIENCE

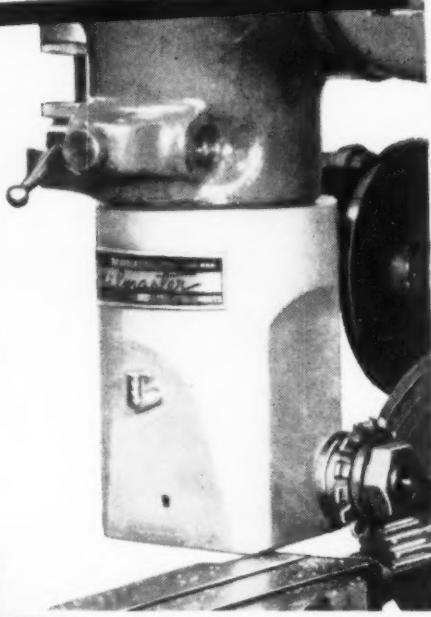
# milmaster

## PAYS FOR ITSELF IN A FEW DAYS!

YOU CAN convert a horizontal or vertical milling machine into a universal miller... with a MILMASTER. This rugged, precision tool *doubles* your machine capacity... slashes set-up time by as much as two-thirds.

MILMASTER is built by one of New England's oldest metal working specialists and is bringing completely new efficiency and economy in service the country over.

MAIL COUPON NOW FOR  
FULL INFORMATION



MILMASTER for horizontal  
and vertical milling machines.

BEMIS & CALL COMPANY, 125 Main St., Springfield, Mass.

I am interested in more machine capacity. Please send me full details on the MILMASTER.

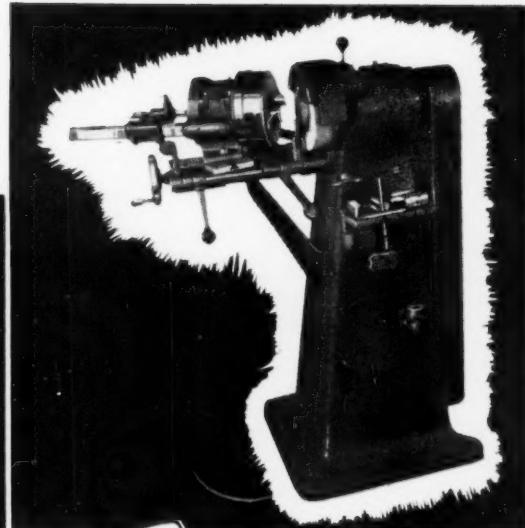
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**OLIVER  
OF  
ADRIAN**



# SAVE DOLLARS IN YOUR TOOL ROOM



Save dollars, save time, with the Oliver Drill Pointers. Twist drills sharpened on the Oliver No. 510 Drill Pointer are more uniform, have longer drill life, because the Oliver Drill Pointer produces a theoretically perfect point that is always constant.

Inspection of a drill pointed on an Oliver Drill Pointer will show a gradually increasing clearance toward the center of the drill, with less chisel point angle. This reduces thrust and increases the operating life of the drill.

Let us prove it to you . . . Send us a few of your drills to sharpen—then check the results in your own tool room. No obligation.

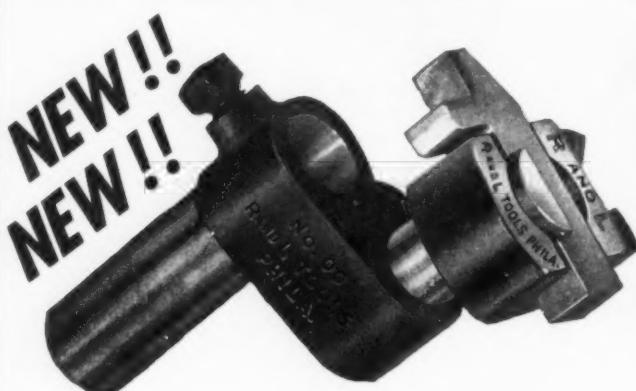
## THE OLIVER DRILL POINTERS

No. 510 for drills  $\frac{1}{4}$ " to 3"—2-3-4 flute. Variable clearances. Variable point angles. Full automatic operation.  
No. 21 Oliver Bench Drill Grinder. Hand operated for drills No. 57 to  $\frac{1}{2}$ ". Right hand, with an improved point. Attachments are available for grinding oil hole drills, left hand and other special points.

Write for literature that will save you dollars in your tool room.

**OLIVER INSTRUMENT CO.**  
1408 E. MAUMEE • ADRIAN, MICHIGAN

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DIEMAKING MACHINES



**R AND L**  
**TURRET**  
**BACK REST**  
**HOLDER**

For use on R and L Turning Tools. Simple design allows for convenient interchanging of the R and L carbide surfaced or Roller Backrest (above) and the R and L Burnishing Backrest shown below. Built in sizes to fit all R and L Turning Tools.

•  
**R and L Tools Changed in Ten Seconds for Right or Left Hand Turning.**  
•

Manufacturers of Precision Tools for Screw Machines.  
•

Also Turning Tools . . . Roller Backrests . . . Carbide Backrests . . . Tap and Die Holders . . . Universal Tool Posts.



*This*  
**TURNING  
TOOL . . .  
Replaces  
14 TOOLS**

Can be changed from  
RIGHT to LEFT  
. . . in 10 Seconds

Write for Literature

**R AND L TOOLS**  
1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.

# CHICAGO

Powerful

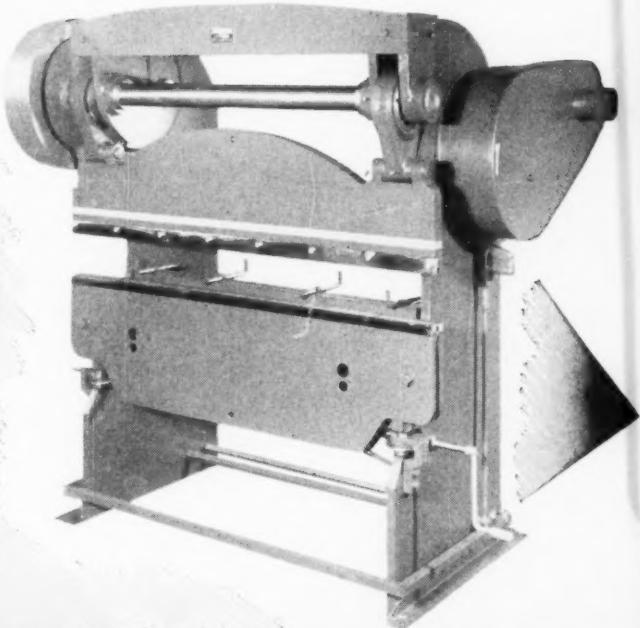
TYPE "300"

## STEEL PRESS BRAKE

A Press Brake made to exacting standards and built to take hard and continuous use.

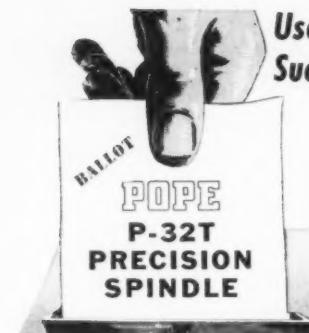
This press will do your work well and efficiently. Dependable service is guaranteed and proven by many years of operation. Variable speed drive for speed and safety.

This is only one of the many fine presses made under the banner CHICAGO. There is a CHICAGO steel press brake to meet your requirements. Your die problems are ours—let us help you.



**DREIS & KRUMP MANUFACTURING CO.**  
7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS

## Users Vote This One of The Most Useful and Successful Spindles Ever Built



P-32T over-all length 25 $\frac{1}{2}$ ", 3 $\frac{1}{2}$ " dia. barrel, 3450 RPM motor.

P-6751 is same design, motor housing 2" longer, 1,800 RPM motor.

Designed to equip 6" x 18" surface grinders with a Spindle that would produce finer finishes at lower cost, this POPE Direct Motorized, Sealed Package Spindle has not only swept the field on this application but has been promptly drafted for hundreds of other jobs.

A glance at the cut-away spindle will show you why this 1 HP, 3600 RPM sealed-package motorized spindle has been successful in so many different applications.

It has two double row precision cylindrical roller bearings and two thrust bearings all permanently

preloaded and permanently lubricated. No further attention as to bearing adjustment or lubrication is required.

It has a full 1 HP motor not only "fully enclosed" but permanently SEALED-IN. No dirt or dust can ever reach the motor or bearings.

This spindle can be mounted horizontally, vertically or at any angle.

You can buy this Pope Sealed-Package Spindle with confidence. It will remove the surplus metal fast and produce a fine surface finish.

*A few of the many adaptations of this spindle are shown below*



P-2652

3 $\frac{1}{2}$ " dia. barrel 11 $\frac{1}{2}$ " long, 1 $\frac{1}{2}$ " dia. spindle nose tapered 3 $\frac{1}{2}$ " per foot.

Wheel Holder P-551 or P-555 for wheels with 1 $\frac{1}{4}$ " holes and widths up to 3 $\frac{1}{4}$ ".



P-5101

2 $\frac{3}{4}$ " dia. barrel 16" long and 4" dia. barrel 3 $\frac{1}{2}$ " long, 1 $\frac{1}{2}$ " dia. spindle nose tapered 3 $\frac{1}{2}$ " per foot. Wheel Holder P-567 for wheels with 1 $\frac{1}{4}$ " dia. holes, width up to 1".



P-442

3" dia. barrel 7" long, 1 $\frac{1}{2}$ " dia. spindle nose tapered 3" per foot. Wheel Holder P-551 or P-555 for wheels with 1 $\frac{1}{4}$ " holes and widths up to 3 $\frac{1}{4}$ ".



P-1723

3" dia. barrel 6" long with flange for endwise adjustment screw, 1 $\frac{1}{2}$ " dia. straight spindle extension with collars and nut for wheels with 1 $\frac{1}{4}$ " dia. holes and for widths up to 1 $\frac{1}{2}$ ".



P-2641

3" dia. barrel 5" long, 1 $\frac{1}{4}$ " dia. straight spindle extension 1 $\frac{1}{2}$ " long, 1" maximum dia. Jarno tapered hole with 7/16-14 RH tapped hole at bottom for standard interchangeable extension arbors or collet chucks.



P-1744

3 $\frac{1}{2}$ " dia. barrel 30" long and a 3 $\frac{1}{2}$ " dia. extension 4" long at opposite end of motor. 1" diameter spindle nose tapered 3" per foot.

Wheel Holder P-555 for wheels with 1 $\frac{1}{4}$ " holes and for widths up to 3 $\frac{1}{4}$ ".



P-640

3" dia. barrel 12 $\frac{1}{2}$ " long, 1 $\frac{1}{2}$ " dia. straight shaft 5" long reduced to 1 $\frac{1}{2}$ " dia., 1 $\frac{1}{2}$ " long. Wheel collar and wheel retaining screw for wheels with 3/8" dia. holes and widths from 1" to 1 $\frac{1}{4}$ ".



P-1766

4" dia. barrel 16 $\frac{1}{2}$ " long. Spindle extension is 18-18 LH threaded, 7 $\frac{1}{2}$ " long. 2 Wheel Holders for wheels with 1 $\frac{1}{4}$ " dia. holes, 1 $\frac{1}{2}$ " wide. Cup type wheels facing each other are shown. Outer wheel holder can be located if wanted.

Write for Data Sheet 12 which will assist you in preparing specifications for the unit you require.

# POPE

TRADE MARK REG. U.S. PAT. OFF.

No. 69  
POPE MACHINERY CORPORATION  
ESTABLISHED 1920  
261 RIVER STREET • Haverhill, Massachusetts  
BUILDERS OF PRECISION SPINDLES

## MODERN PRECISION TOOLS

MODERN COLLAPSIBLE TAPS



MODERN-MAGIC CHUCKS AND COLLET EQUIPMENT

Modern Precision Tools include . . . . .

STATIONARY SELF-OPENING DIE HEADS  
ROTARY SELF-OPENING DIE HEADS  
STATIONARY COLLAPSIBLE TAPS  
ROTARY COLLAPSIBLE TAPS  
MODERN-MAGIC CHUCKS AND COLLETS  
SELF-OPENING STUD SETTERS  
INSERTED BLADE FACE MILLING CUTTERS  
SOLID ADJUSTABLE DIE HEADS  
ADJUSTABLE HOLLOW MILLING TOOLS  
UNIVERSAL CHASER GRINDING FIXTURES

Modern Self-Opening Die Heads are available in both stationary and rotary types. The stationary type is made in a range of 4 sizes with capacity for cutting straight threads from  $\frac{1}{8}$ " to 7", and  $\frac{1}{8}$ " to 6" for pipe threads. Rotary type, straight threads from  $\frac{1}{8}$ " to 1 $\frac{1}{4}$ ", pipe threads from  $\frac{1}{8}$ " to  $\frac{3}{4}$ ".

Of unusually simple design with a minimum number of parts and no complicated mechanisms, this new Modern Collapsible Tap Style A-A helps meet industry's demand for faster, lower cost production. It is made in a wide range of sizes with adequate capacities for cutting straight threads and straight and taper pipe threads. All parts are of properly hardened steel, ground and precision fitted.

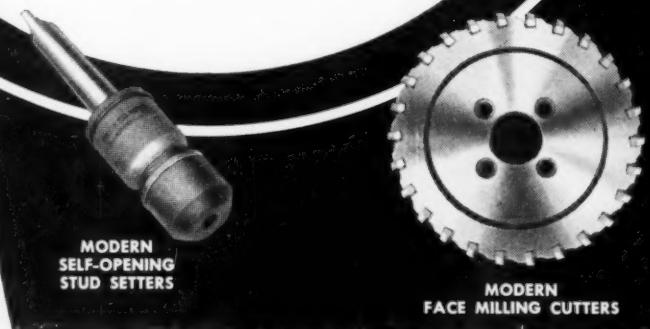
Modern Self-Opening Stud Setters are positive and entirely automatic in action, and can be operated in any position with either air or electrically driven portable tools. Also equally effective in drill presses where it is possible to drill and tap the holes and set the studs in successive operations. Made in two sizes  $\frac{1}{2}$ " and  $\frac{3}{8}$ " capacity.

Modern-Magic Quick Change Chuck and Collet Equipment virtually eliminates costly idle time usually present in revolving spindle operations. Tools are changed without stopping or even slowing the spindles. Modern-Magic Chucks are made in 6 sizes and two types: friction drive and positive drive. Modern-Magic Collets are available in a broad range of both standard and special types.

Modern Medium Duty Face Milling Cutters are of blade backed design, and are made in axial and radial types. Standard Modern axial type cutters are available in diameters from 4" to 24". Standard radial type cutters from 8" to 24" diameters. All blades, wedges and screws are interchangeable in all Modern Cutters regardless of diameters.

Detailed information covering any Modern Precision Tool in which you are interested will be furnished promptly upon request. Let us show you how Modern Precision Tools can help to speed up your production and reduce your costs.

MODERN SELF-OPENING STUD SETTERS



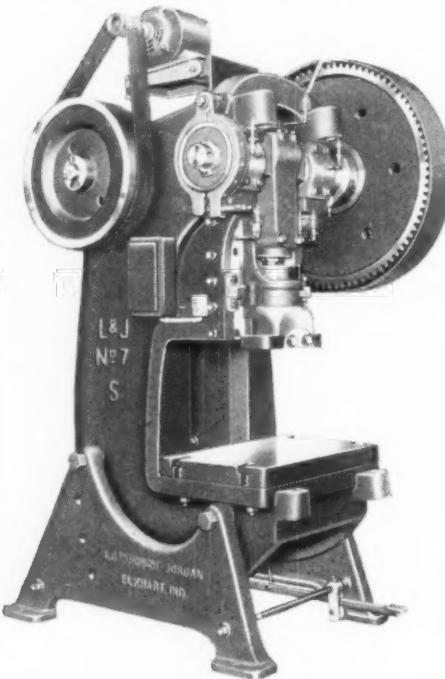
MODERN FACE MILLING CUTTERS

Modern Precision Tools are produced by the originators of the Modern-Magic Quick Change Chuck and Collet Equipment.

**MODERN TOOL WORKS**  
DIVISION OF  
**CONSOLIDATED MACHINE TOOL CORPORATION**  
**ROCHESTER 10, NEW YORK**

# NEW!

## No. 7 L & J PRESS



CAPACITY ..... 80 tons  
STROKE ..... 4" (standard) to 8"  
STROKES PER MINUTE ..... 41 to 45  
DIE SPACE ..... 15½" (standard) to 20"

Here's a new L & J 80-ton O.B.I. press that makes possible even faster, lower-cost production. It has all the L & J features that keep efficiency high and maintenance low — heavy, deflection resistant frame . . . precision slides . . . extra long gibs . . . rugged dependability . . . easy set-up . . . increased die life . . . adaptability for a wide range of work.

Back geared model shown. Also available in plain flywheel model with standard or new friction clutch.

If your stamping and drawing costs are a problem, write for literature on the L & J No. 7 Press — also, 11 other models, 6 to 50 ton capacities.

**L & J PRESS**

C O R P O R A T I O N  
SUCCESSORS TO LASHBROUGH-JORDAN TOOL & MACHINE CO. ESTABLISHED 1910

1625 STERLING AVENUE, ELKHART, INDIANA



# CURRENT MOTOR PROBLEMS ARE SOLVED BEST BY

## CIRCLE SAWS

FOR  
**COMMUTATOR SLOTTING  
and Mica Undercutting**

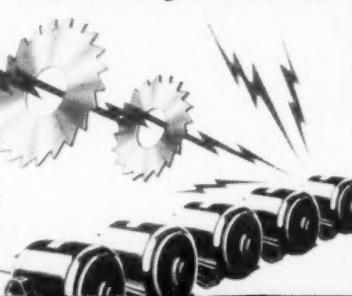
That's right . . . today wherever electric motors for land, air or sea power are made, you'll find CIRCLE R saws at work!

These CIRCLE R Saws are clearance ground to prevent binding.

"U" and "V" Type  
High Speed Steel  
or Solid Tungsten Carbide



Complete listings of these and other CIRCLE R products are available in catalog M.



### CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

CHICAGO • CLEVELAND • DAYTON • DETROIT • INDIANAPOLIS  
LOS ANGELES • MILWAUKEE • MINNEAPOLIS • NEW YORK CITY  
PHILADELPHIA • PHOENIX • PITTSBURG • PROVIDENCE  
ROCHESTER • ST. LOUIS • TOLEDO

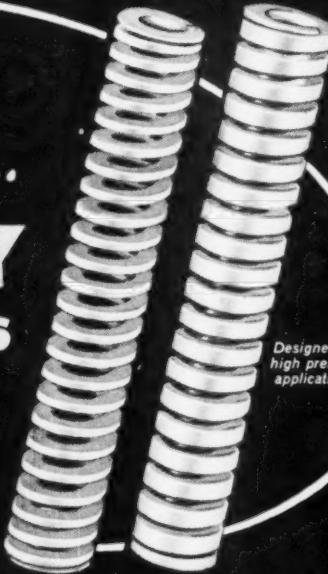
2

## COMPLETE LINES HELP SOLVE DIE DESIGN PROBLEMS

*Save with...*

### DANLY DIE SPRINGS

*Designed for  
medium pressure applications.*



*Designed for  
high pressure  
applications.*

Why compromise when you can specify die springs that meet your individual requirements more exactly? Danly's two complete lines double your range of selection for any given application.

Any standard size is available in either medium or heavy duty types.

All Danly Die Springs are precision coiled from the finest fatigue resistant steel and ground square on both ends to assure full end bearing.

Start selecting your die springs to fit the job . . . specify  
**DANLY DIE SPRINGS!**

Write today for our special size and price folder giving detailed information on Danly Die Springs and Danly Dowel Pins.



#### DANLY DOWEL PINS



Danly Precision Dowel Pins are hardened (58-60 Rockwell C) to prevent upsetting in driving and are ground to tolerances of  $\pm .0001"$  throughout. A complete range of .001" oversize pins is available for repair of renewal work.



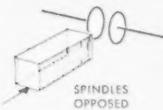
**DANLY MACHINE SPECIALTIES, INC.**

2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS

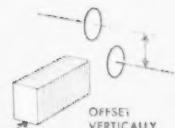
PRECISION DIE SETS . . . MECHANICAL PRESSES

25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

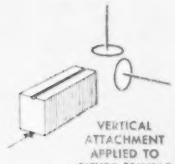
**you can do this**



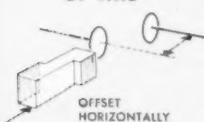
**or this**



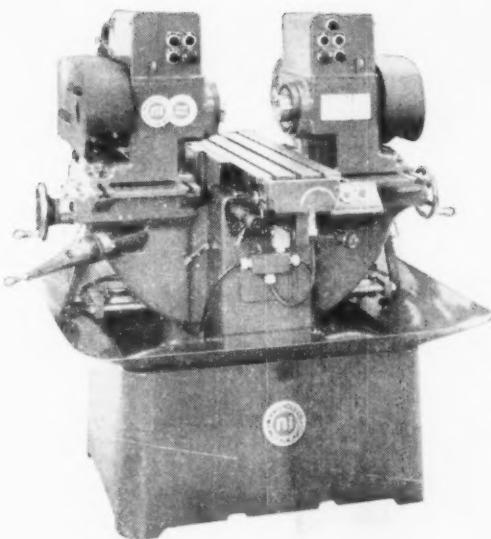
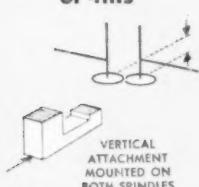
**or this**



**or this**



**or this**



## on the NEW *Nichols* TWIN MILL

The TWIN MILL cuts milling costs in half on many jobs. It handles **TWO** milling operations at a time, yet requires but **ONE** fixture and **ONE** operator. Designed for the class of work usually assigned to Hand Millers or light Automatic Production Millers, the Twin Mill's speed, accuracy, and exceptional flexibility add up to increased output at lower cost. **New** Spindle Retraction automatically withdraws cutters at the end of each cutting stroke. **New** Spindle Brakes act instantly after cycle is completed. The Two Milling Heads are independent units with individual motor drives, quickly adjusted UP or DOWN, IN or OUT, or OFFSET longitudinally. Machine handles short run or long run work economically. Automatic table cycle and entire machine push-button controlled. Write for details.

### CONDENSED SPECIFICATIONS

Table, working surface	8 $\frac{1}{8}$ " x 30"
Table, travel—cutting stroke	11 $\frac{3}{4}$ "
Motors	(two) 1 HP
Maximum height center of spindle above table	11 $\frac{3}{4}$ "
Maximum offset of spindles (horizontal)	8 $\frac{1}{2}$ "
Maximum distance between spindle noses (across table)	16"
Floor space required	64" x 56"
Spindle Speeds (15)	from 55 to 2050 R.P.M.

Manufactured by W. H. Nichols Co., 48-G Woerd Ave., Waltham 54, Mass.

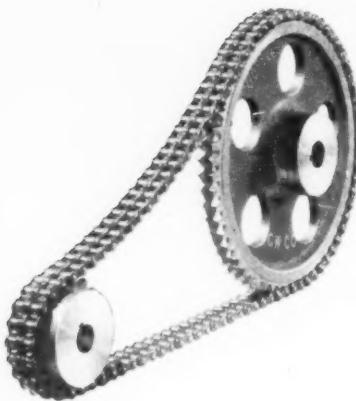


Also available are NICHOLS Hand Millers, NICHOLS two-spindle millers with identical or opposed spindles, and with or without pneumatic feed.

Please address inquiries to

**NICHOLS-MORRIS CORPORATION**

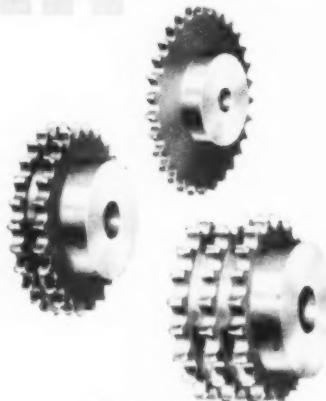
50-G CHURCH ST.  
NEW YORK 7, N.Y.



# CULLMAN SPOCKETS

**OVER 80,000 SPOCKETS AND  
80,000 FT. OF CHAIN IN STOCK**

There are important advantages in bringing your sprocket requirements to Cullman Wheel. Chief among these is the fact that in fifty-five years of specialization in the design and manufacture of sprockets and kindred power transmission parts, has built up the amazing total of over eighty thousand sprockets in stock. Invariably your requirements can be met quickly from this great sprocket and chain inventory. This always brings the cost down. Quick delivery is also available at Cullman on special made to order sprockets. Send your blue prints for recommendations and estimates.

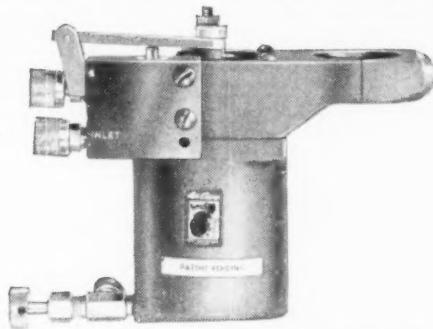


SEND TODAY FOR INFORMATIVE CATALOG



**CULLMAN WHEEL COMPANY**  
1350-W ALTGELD STREET • CHICAGO 14, ILLINOIS

# DOUBLE YOUR DRILL PRESS OUTPUT FOR \$30



## USE A NEW MEAD PNEUMATIC DRILL PRESS FEED

This simple, inexpensive device quickly converts standard drill presses into semi-automatic machines — increases production substantially on suitable jobs: double or more in some cases.

Clamps to spindle quill in a few seconds. Automatically closes air fixture on work. Adjustable feed control and break-through cushion. Quick return. Easy to synchronize with automatic cycle equipment.

Air-Power does it quicker, cleaner, better. Write today for latest complete catalog.

for

**DRILLING  
REAMING  
TAPPING**

MEAD  
SPECIALTIES COMPANY  
4114 No. Knox Ave., Dept. YA-50, Chicago 41, Ill.



## Ask the Man with Holes in His Head!

**...to cut your boring costs**

What'll it get you to ask about boring? just this — lower costs. Lower costs through savings in time and money. Because "the men with holes in their heads" provide newer, faster, lower cost methods of boring. You may need special bars and special cutters. If so, they'll be designed for you. More likely the right standard Madison cutter in the right Madison bar can give you full production economy . . . and the Madison line of boring tools is broad enough to fit nearly any boring problem. Why not let Madison — experienced specialists in boring and boring only — cut your boring costs? Ask us. A brief letter will do it. No obligation of course.

### BETTER BORING TOOLS

Madison's two-bladed cutter provides generous chip clearance — permits faster cutting without overheating. It floats in a Madison bar, special floating tool holders are never needed. More holes per cutter and more regrinds per cutter. Cutters can be changed without disturbing setup. Tolerances to .0003. These and other Madison features cut your boring costs.

### MORE BORING EXPERIENCE

Literally thousands of boring jobs have been solved by Madison in the past thirty-five years. With this experience to draw upon, Madison can give you the right answer, sooner. Which means your savings from lower cost production begin sooner, too.

*Write for the information filled Madison Catalog. It is yours for the asking.*

**MADISON** MANUFACTURING COMPANY  
DEPT. BB MUSKEGON, MICHIGAN

*For Straight  
Hardening*

**LONG, SLENDER HIGH-SPEED  
STEEL TOOLS, SPINDLES,  
BROACHES, REAMERS, ETC.**



## **SENTRY** MODEL YP VERTICAL ELECTRIC FURNACES

Large or long, slender high-speed steel tools, broaches, spindles, etc. are best hardened in the specially designed Sentry Model YP Vertical Electric Furnace. Employs the Sentry Diamond Block Method of Atmospheric Control for maximum quality hardening of molybdenum, tungsten or cobalt high-speed steels. No scale or decarburization.

Finished work is smooth, dimensionally correct and true to shape, saving costly finishing operations.

Sentry Electric Furnaces are made in sizes and capacities to meet your requirements.

You'll be interested in our latest catalog. Ask for bulletin YP-D3.



**The Sentry Company**  
FOXBORO, MASS., U.S.A.



The Right Tools  
in his Hand . . .



## PUT PROFIT INTO THE OPERATION

• If you want the best from every drillpress operator, give him the machine he can handle with minimum fatigue and lost motion — the drill that lends accuracy and skill to his hand — one of the complete line of "Buffalo" drills so widely used

in industry today. For the profitable solution to your drilling problems, simply write:



**BUFFALO FORGE COMPANY**

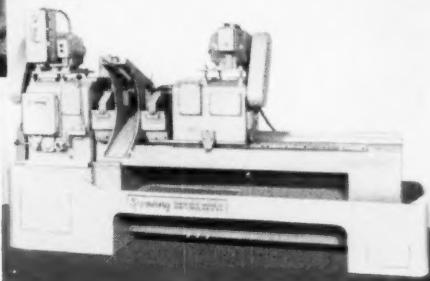
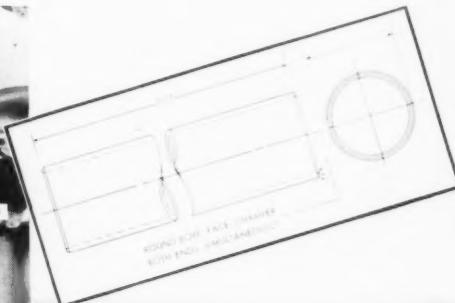
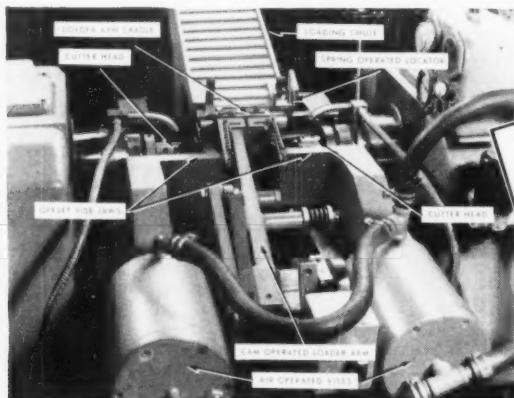
161 MORTIMER ST.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

BUFFALO, N.Y.

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



## MODEL "CS" Lo-swing SPEEDS MACHINING OF SHOCK ABSORBER TUBES

**Problem:** To automatically load, unload and machine both ends of Hydraulic Shock Absorber Tubes at high production rate.

**Solution:** The Model "CS" Lo-swing Automatic Drilling and Centering Machine selected for this job was equipped with an automatic loader of the type shown in the small illustration.

The tubes, which are cut 1/16" over the required length, are fed into the upper chute, shown in the large illustration, and ejected into the lower chute after being machined. Details of the loading arm, which is cam operated, are also shown in this illustration. Tubes are fed by gravity down the loading chute into the loading arm cradle where they are properly positioned lengthwise by a spring operated locator. The loading arm then lowers the tube into the air-

operated vise jaws where it is securely clamped, after which the loading arm is raised to pick up the next piece.

When the loading phase of the cycle is completed, the two revolving cutter heads advance in rapid traverse and slow down into feed just before the tools reach the work. Three cutters are used in each head . . . one cutter for facing to overall length, one for rounding the bore, and one for chamfering the O.D. The machining completed, the cutter heads retract in rapid traverse and the vise jaws open, allowing the finished part to drop into the unloading chute. The complete cycle is slightly under five seconds per piece, assuring a production of 750 pieces per hour.

Engineered jobs are our specialty. Seneca Falls is at your disposal to assist in solving your problem.

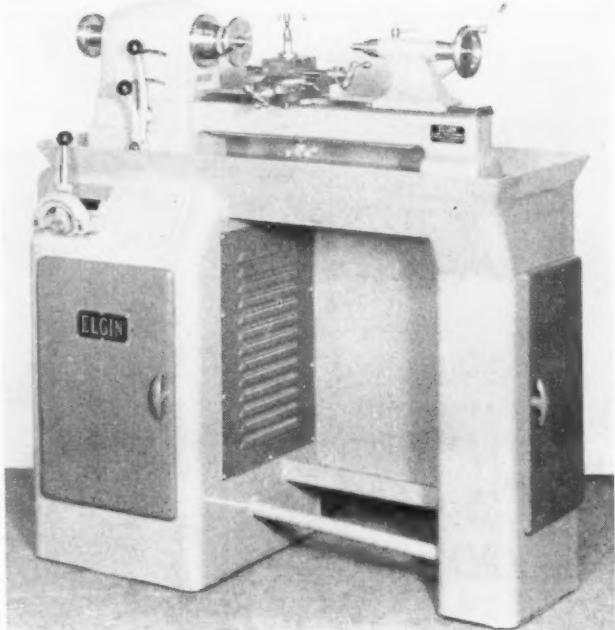
SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH *Lo-swing*

# ELGIN

NOW PROVIDES OPERATOR

COMFORT.

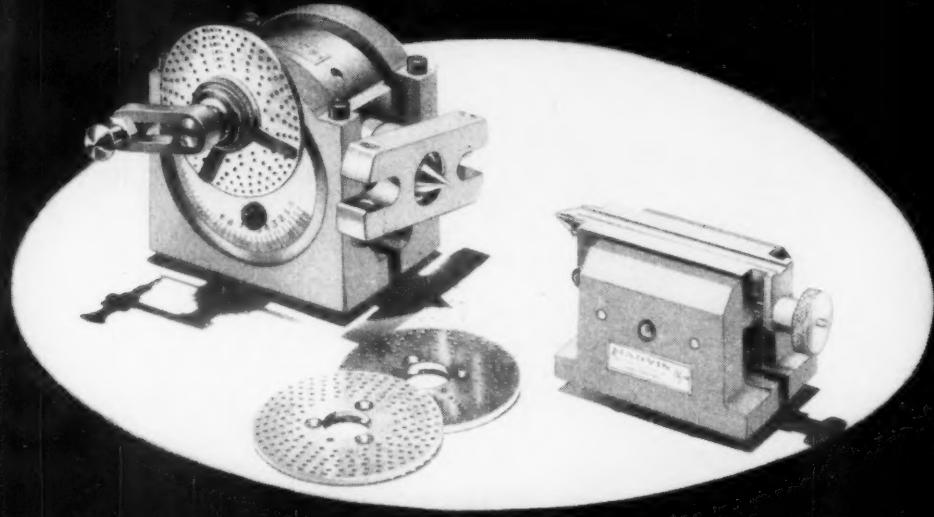


- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
- Three shelves are provided on right hand side.
- Collet board is on left hand door, below the convenient centralized controls.
- Variable speed drive provides stepless spindle speeds from 40 to 4000 rpm.

*Write for full details.*

## ELGIN TOOL WORKS

1772 BERTEAU AT RAVENSWOOD AVE. - CHICAGO, 13 ILL.



# Now! MARVIN PRECISION DIVIDING HEAD

A New Dividing Head made to the exacting precision standards of Marvin Tool Makers. Designed for dividing operations required in gear cutting, layout, splines, fluting taps or reamers, cams, hex screws and squaring shafts. The unit comes complete with 3 index plates, each plate having 6 sets of holes. It will tilt from 5 degrees below horizontal axis to 30 degrees past vertical axis. Total 125 degrees. The complete dividing head weighs 15 lbs. Tail stock has two pins, which align it in a horizontal position with the head stock. It is vertically adjustable for tapered work. Head has 40:1 ratio. Tail center travel is one inch. Spindle nose No. 2 Morse taper socket and 1"-10 threads. Rugged head and tail stock. Head is carried on two heavy trunnions.

Priced at \$9950

**Marvin precision materially reduces production costs.**

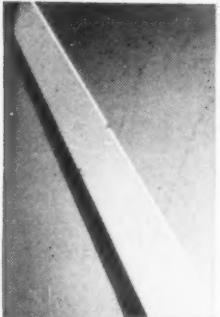
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**MARVIN**

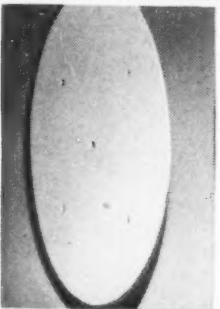
MACHINE PRODUCTS, INC.



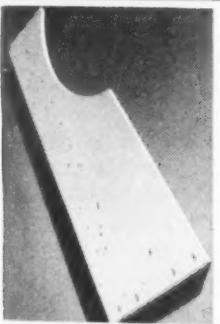
SALES OFFICE • 414 FORD BLDG.  
DETROIT 26, MICHIGAN



An **electric refrigerator** part,  $39\frac{3}{8}'' \times 8\frac{1}{2}''$ , with 10 holes and 4 notches was fabricated including setup in only 5.61 minutes and subsequent pieces in only . . . . . **37 sec.**



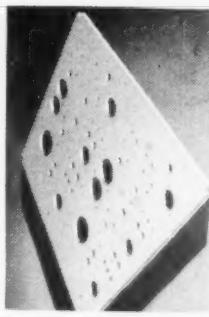
Above circle,  $24''$  in diameter with OD nibbled and 5 holes punched was produced in only 4.26 minutes including setup and subsequent pieces in only **2.38 min.**



A part of a piece of **farm equipment**,  $72\frac{1}{2}'' \times 22''$ , with 32 holes and nibbled cut-out was finished including setup in only 12.01 minutes, subsequent pieces in only **2.32 min.**



The first **radio chassis**,  $10'' \times 14''$ , with 27 holes and 4 notches shown above was produced including setup in only 9.3 minutes and subsequent pieces in only . . . . . **1.8 min.**



Above **electronic chassis**,  $12\frac{1}{2}'' \times 11\frac{1}{2}''$ , with 118 holes and 4 notches was completed including setup in only 32.45 minutes and subsequent pieces in only **6.44 min.**

## Can you match these **WALES FABRICATOR** TIME STUDIES with your present methods?

- These time studies were made under actual production conditions with average operators and were taken at random from hundreds of time studies parts.
- There is nothing like this revolutionary Wales Fabricator. It punches, notches and nibbles. Wales exclusive Hydra-New-Matic Drive is unique in its simplicity of design and operation...so unique, in fact, that vibration and noise is practically eliminated at 165 strokes a minute. This



An **automotive** channel,  $28''$  long with 12 holes was fabricated including setup in only 3.37 minutes and subsequent pieces in only **29 sec.**

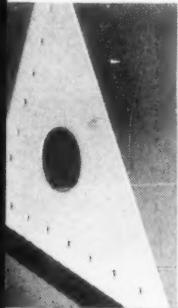
yourself why production schedules of this fabricator have been more than doubled.

### WALES-STRIPPIT CORP.

George F. Wales, Chairman  
**396 PAYNE AVENUE**  
**North Tonawanda, N.Y.**

(Between Buffalo and Niagara Falls)  
WALES-STRIPPIT  
OF CANADA LTD.  
HAMILTON, ONTARIO  
Specialists in Punching and  
Notching Equipment

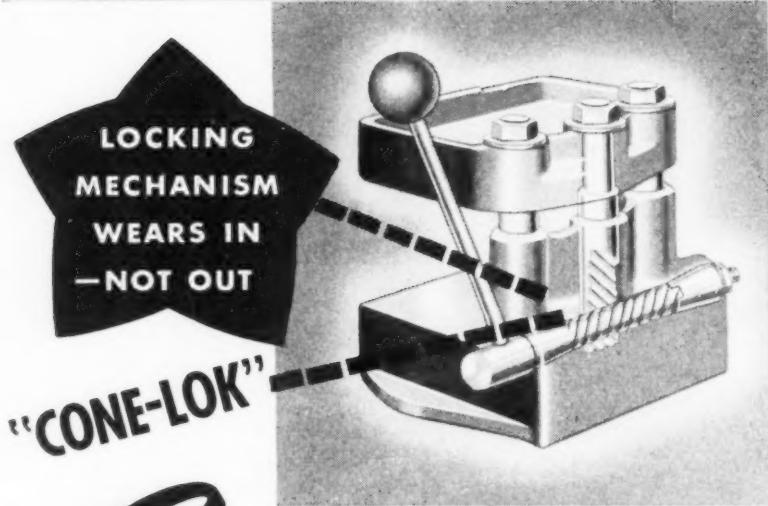
An aircraft gusset plate  $7\frac{1}{2}'' \times 4\frac{1}{2}''$  with 15 holes and 1 notch was produced including setup in only 35.2 minutes and subsequent pieces in **54 sec.**



A piece of work,  $11\frac{1}{4}'' \times 24''$ , with 9 holes and 4 notched, rounded corners was produced including setup in only 4.99 minutes and subsequent pieces in only **41 sec.**

The above piece of work,  $22\frac{3}{4}'' \times 9\frac{1}{2}''$  with 4 holes and 2 sides notched and nibbled including setup was produced in only 6.10 minutes and subsequent pieces in only **1.2 min.**





# THE JIG WITH A LIFETIME\*

*Guarantee* ON THE LOCKING MECHANISM

- Just think of this. It's no longer necessary to carry an inventory of spare parts. And when you eliminate costly inventory you save again in storage space and taxes! Add to this the saving on maintenance costs and down time on production. Don't overlook these values when planning your 1950 program. Write for literature, complete details.

\* We absolutely guarantee forever the locking mechanism on the Cone-Lok.

## WOODWORTH

N. A. WOODWORTH CO. • 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN  
PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS • PRECISION PARTS

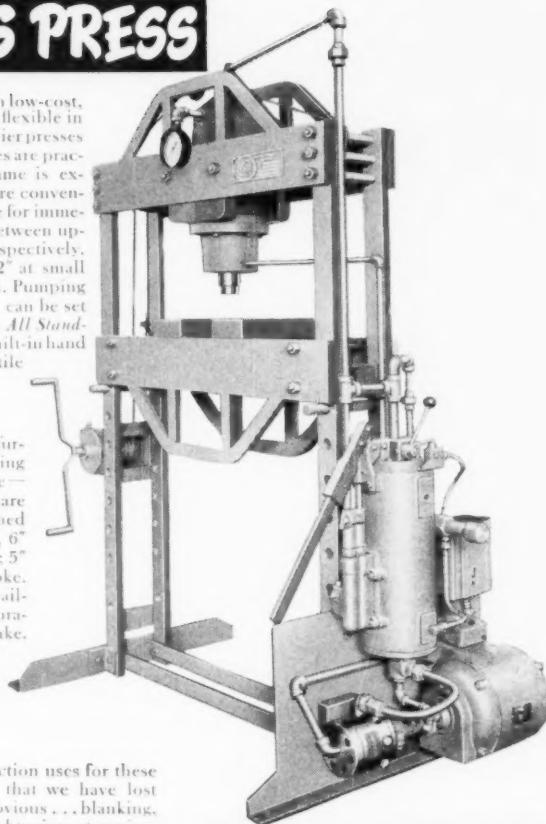
# LOOK AT THIS PRESS

It's designed to provide industry with low-cost, high production units that are highly flexible in design and operation...relieving heavier presses of short runs and lighter work. Presses are practically fool-proof in operation. Frame is extremely rugged. Fingertip controls are conveniently located at hand level. Available for immediate delivery, in standard width (between uprights) of 24"-31"-36"-42" respectively. Available in special width up to 72" at small additional cost. Movable bed plates. Pumping unit has by-pass relief valve which can be set at any pressure up to press capacity. All Standard presses equipped with 2-speed built-in hand pumps for more sensitive and versatile operation.

## READ THESE "SPECS":

**CYLINDERS:** Standard Models furnished with 6" bore, 7½" stroke—spring return type; also 5" bore, 7½" stroke—spring return type. Above presses are standard. Following can be furnished at additional cost: Double Acting, 6" bore, 7" stroke; 6" bore, 11" stroke; 5" bore, 7" stroke; 5" bore, 11" stroke. Special long stroke cylinders also available, up to 48" in length, for incorporation in suitable press frames of our make.

**PUMPING UNITS:** These units can be supplied in various volumes and pressures, in a total of 13 combinations.



## CHECK THESE USES:

There are so many everyday production uses for these versatile KRW Hydraulic Presses that we have lost count. Here are a few of the more obvious...blanking, forming, bending, broaching, straightening, stamping, embossing, numbering, upsetting, laminating, pressing and hot or cold forging.

## BEAT THESE PRICES\*:

Depending upon capacity of pumping equipment, prices of Standard model motor driven hydraulic presses are as follows, F. O. B. Factory: 25-ton press from \$727.00 to \$992.00, 50-ton press from \$806.00 to \$1058.00, 60-ton press from \$1070.50 to \$1135.00, 75-ton press from \$1198.00 to \$1258.00. All motors in the above units are 220/440 volt, 3 phase, 60 cycle. Any change in motor specifications is extra.

\*Subject to change without notice.

# K·R·WILSON

215 MAIN ST. • BUFFALO 3, N.Y.

## MAIL THIS COUPON

K. R. WILSON, 13  
215 Main St., Buffalo 3, N. Y.

Please send me complete information on  
KRW Motor Driven Presses as follows:

- 25-ton       50-ton       60-ton  
 75-ton presses       Press Cap.  
 motor drive conversion unit

Serial No. \_\_\_\_\_

Name \_\_\_\_\_

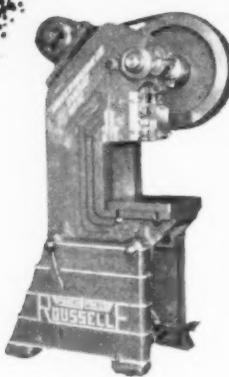
Address \_\_\_\_\_

City and Zone \_\_\_\_\_

State \_\_\_\_\_

# EFFICIENT LOW-COST PRODUCTION

MEANS ROUSSELL E PUNCH PRESSES



#### OBI PRESS

A rugged Open Back Inclinable Press designed for efficient low cost production.

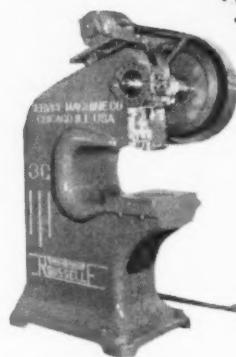


#### HORN PRESS

Adjustable bed provides wide range of die space. Bed easily removed for hoisting dies or special applications.

Twelve Models To Choose From

#### WRITE FOR DETAILS



#### DEEP THROAT

Can fabricate large pieces and jobs requiring more working space due to throat depth.

## SERVICE MACHINE COMPANY

7627 S. Ashland Ave.

Chicago 20, Illinois

PLEASE SEND INFORMATION

OBI  Horn  Deep Throat

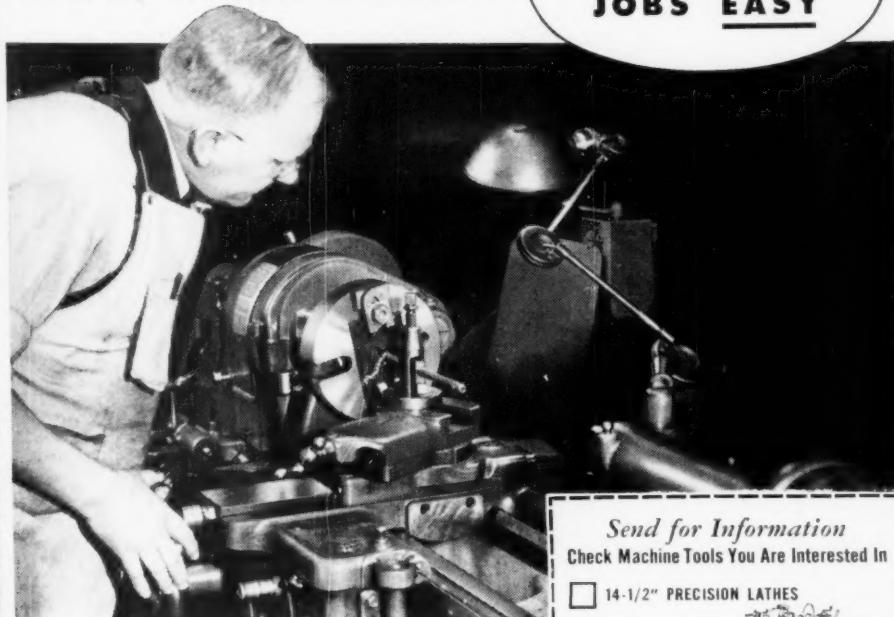
Company Address .....

City ..... State .....

Name ..... Title .....

# South Bend Lathes

MAKE TOUGH  
JOBS EASY



Close tolerances come easy with South Bend Lathes. The accuracy of these precision-built lathes make routine the machining of exacting work. And it is practically without effort, for their operation is simple, easy and smooth.

You'll also find that their versatility is a big help in simplifying tough jobs. The wide ranges of spindle speeds and turning, facing, and thread cutting feeds keep machining efficient. Set-ups can be readily made for awkward jobs. Practical attachments available for various classes of work often eliminate the need for special fixtures or machines.

It will pay you to find out about South Bend Lathes if you want to cut machining costs on both your tough and easy jobs.

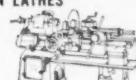


Building Better Tools Since 1906

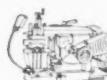
**SOUTH BEND LATHE**  
SOUTH BEND, INDIANA

*Send for Information*  
Check Machine Tools You Are Interested In

14-1/2" PRECISION LATHES



BENCH LATHES  
9" and 10"



TURRET LATHES  
1/2" and 1" collets



7" SHAPER



14" DRILL PRESS

10", 13", 16", 16/24" PRECISION LATHES



LATHE TOOLS AND ATTACHMENTS

TIME PAYMENT PLAN

Name \_\_\_\_\_

Street \_\_\_\_\_

Zone \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_



**Porcelain**

**Products, Inc., uses a**

## **BUCKEYE *STREAM POWER* AIR DRILL**

- To drill clean, accurate holes in porcelain fuse boxes, Porcelain Products, Inc., Parkersburg, W. Va., selected a Buckeye portable air drill. The higher drilling speed of this powerful tool eliminated the ware breakout and chipping experienced when slower drills penetrated the inner wall of the semi-moist clay . . . in addition, the compact Buckeye air drill can be used with special jigs which increase productive output and insure absolute alignment of door hinge assembly holes, which

must be drilled separately in opposite sides of each fuse box.

This manufacturer of electrical porcelain products not only solved a difficult, costly production problem with a Buckeye air tool, but made real savings in production time and costs as well. If portable air tools enter your production picture, we'd like to show you—in your own plant—what Buckeye Tools can do . . . no obligation, of course.

#### AIR TOOLS:

- Horizontal Grinders and Buffers • Vertical Grinders and Sanders • Belt Sanders Nibblers • Shears • Drills Wrenches • Screwdrivers.

#### HIGH FREQUENCY ELECTRIC TOOLS:

- Grinders • Buffers • Sanders • Polishers • Drills Screwdrivers • Nutrunners

Have you seen the  
**BUCKEYE CATALOG?**

A copy of the fact-filled,  
helpful Air Tools Catalog  
is yours for the asking.



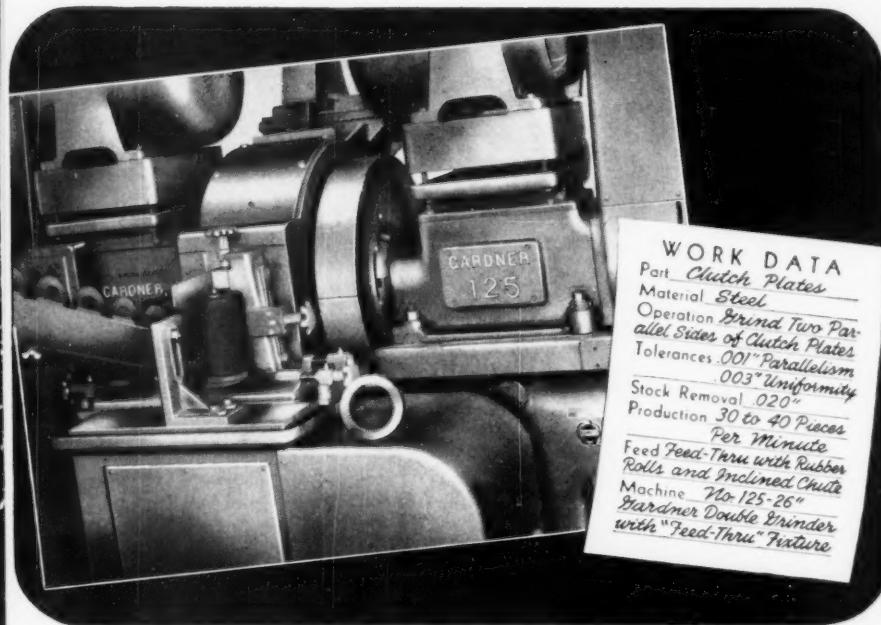
# **Buckeye Tools**

CORPORATION

DIVISION 14 • DAYTON 1, OHIO

*Double*  
**GARDNER-GRINDING**

... cuts  
production time  
in half



Grinds two parallel sides of Clutch Plates at once!

**GARDNER-GRIND**  
Your Flat Surfaces

**P**ARALLEL-surface grinding is the GARDNER way to cut production costs on dozens of jobs. A typical example is the automotive steel clutch plates being ground at the rate of 30 to 40 pieces per minute on the Gardner No. 125-26" Double-Grinder illustrated.

You, too, may have parallel-surface parts which can be handled on a Gardner Grinder.

Ask for our **DOUBLE-GRINDING Bulletin!**

**GARDNER MACHINE COMPANY**

436 EAST GARDNER STREET . . . BELOIT, WISCONSIN, U.S.A.

Here are the power blades for

# EXTRA

performance

## BLU-MOL®

Saves up to 50% on  
high speed sawing costs

Wherever hacksawing is properly supervised, Blu-Mol Double-Life® blades can give the lowest cost per cut of any blade. Extremely hard teeth are cut on both edges with a differential set that allows the second edge to follow the kerf of the first without wear.

Thus, one Blu-Mol Double-Life does twice the work, yet costs less than 1/3 more than the best single-edge molybdenum blade.

No. 8884JE  
18" x 2" - .085" - 4T

MILLERS FALLS  
TOOLS

SINCE  
1868

Write today for FREE demonstration  
on your own work in your own hacksaw  
machines. Just set the date, and we'll be  
there. No obligation, of course.

MILLERS FALLS COMPANY • GREENFIELD, MASS.

## JET-EDGE®

Greatest performer in  
the history of machine  
blades

In plant after plant from coast to coast, Millers Falls remarkable new Jet-Edge is setting production records that make seasoned shop men agree it outperforms the finest blades they've ever used.

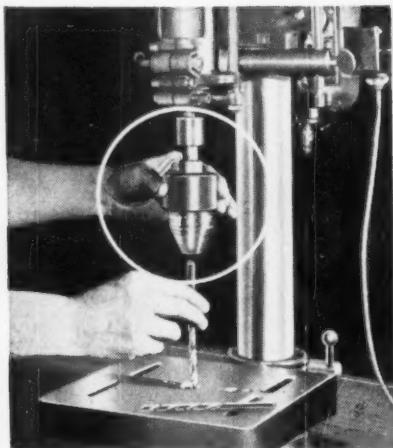
Its super high speed edge welded to an extra strong back cuts cutting costs even on the toughest work and makes this rugged, highly efficient blade unbreakable, shatterproof, safer to use.

World's  
most com-  
plete and highly  
developed line of  
metal cutting saws

New "Blu-Mol"® follow-through-type Hole Saws, unbreakable "Tuf-Flex"® and "Blu-Flex"® hand blades, Metal-Cutting Bands, the famous "Blu-Mol Tensiometer"® — all good reasons why it pays to standardize on Millers Falls — the line that's first with the best!

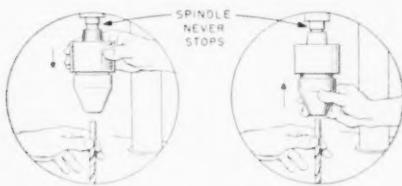
No. DL 1884A  
21" x 2" x .085" - 4T

# Change drills in a second, safely with this Automatic Chuck while spindle is running



AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

## HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down  
—jaws open automatically  
—drill is released.

2. Insert new drill—push  
up tapered part—drill is  
locked in place.

You don't stop the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for buring, turning, filing, etc. One spindle does the work of several.

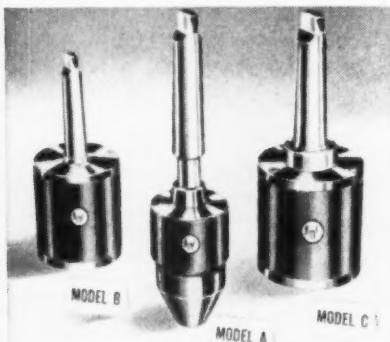
Tools last longer, too...smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools... Model A-1/32" to 1/2"; Model AA-1/64" to 3/8"

See your local distributor or write today  
for Bulletin 56-4

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.  
5502 SECOND AVENUE BROOKLYN 20, N. Y.

## THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges:  
Model A-1/32" to 1/2"; Model AA-1/64" to 3/8"  
Model B-15/64" to 1/2", 3/8" to 3/4", 17/32" to 1"  
Model C-Holds any size tool with No. 1, 2, or 3 M. T. Shank.

**WAHLSTROM**  
*fully automatic*  
**DRILL CHUCKS**  
NO KEYS, COLLETS OR WRENCHES



in the toolroom...

C/R's

# NEW JAW-HEAD

## Rawhide HAMMER

adds new convenience to the safety and protection of Rawhide

Men in the toolroom find C/R's new Jaw-Head hammer a real time-saver. Rawhide faces are replaced in a jiffy—loosen a nut, insert new faces, tighten nut and they are held in a vise-like grip. C/R Jaw-Head hammer faces are made of tough, resilient waterbuffalo hide . . . superior in their ability to absorb shock, deliver powerful blows, and protect delicate finishes. Safety-Flare grip handle prevents slipping. For safety, economy and power, get the new C/R Jaw-Head Rawhide hammer!

- Other C/R striking tools:  
Rawhide Mallets, Rawhide Mauls, Solid Head Rawhide Hammers.



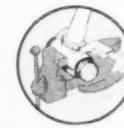
● Out with the old face — in with the new!



To release jaws, loosen this nut.



Change to new C/R Rawhide faces.



To tighten nut, use wrench for best results.

Available from leading Industrial Suppliers.

**CHICAGO Rawhide MFG.CO.**

1321 Elston Ave.

Chicago 22, Illinois



WRITE FOR  
NOPAK  
BULLETIN HC-1

## New Bulletin PRESENTS NOPAK "SERIES 1500" HIGH PRESSURE HYDRAULIC CYLINDERS

Designed for heavy duty service at high pressures, the New 1500 Series embodies features which contribute to long-range dependability and trouble-free operation. Included are: Positively Locked Piston Assembly, Tubing Flanges secured by Lock-Rings, Compensating Rod Wipers, "O"-Ring Static Seals between heads and tubing. Available in 5 standard mountings, with or without Adjustable Cushioning.

GALLAND-HENNING MFG. CO.

2754 SOUTH 31st STREET  
MILWAUKEE 15, WISCONSIN



Representatives in Principal Cities

**NOPAK**  
**VALVES AND CYLINDERS**  
DESIGNED for AIR and HYDRAULIC SERVICE



The Elox method of removing a broken tool from a part being machined might very aptly be called "Disintegrator Drilling". It makes no difference how hard the broken tool may be. A core is drilled down through it by the Elox electrical disintegrator and the core removed. Then the remaining strips of thread of a tap or the cutting flutes of a drill or reamer are easily collapsed and picked out of the hole.

This method does not in any way damage the metal of the work part or the work already done on it. The temperature of the metal of the work part is not raised sufficiently to cause any metallurgical change.

The Elox method is also used to "drill" holes of various shapes in hardened dies and machine elements without annealing.



**Write for Descriptive Folder and Specifications**

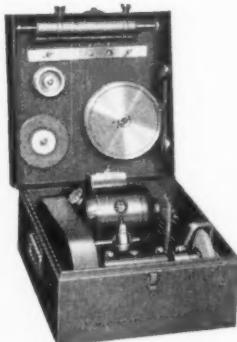
**ELOX** CORPORATION

**744 N. Rochester Road  
Clawson, Michigan  
Phone, Detroit 4-6173**

**More Profit...  
More Work Per Man...  
Per Job...and no "perhaps"**

**For external and  
internal grinding**

## **PRECISION LATHE GRINDER FOR PRECISION PRODUCTION**



**Model  
HLGE**

Speed range up to 30,000 rpm obtained by various size pulleys adapts this grinder for a wide variety of work.

Motor housing pivotally mounted on cast iron base; automatic take-up for belts; special locking device for holding belt tension; T-bolt mounting for radial and vertical adjustment. For mounting on lathes, planers, shapers, milling machines, boring mills in vertical or horizontal position. Can also be mounted on back of lathe; motor and grinding quill can be turned end for end.

*Photo shows grinder and equipment in carrying case furnished as standard equipment.*



**CONTACT YOUR JOBBER... he carries  
United States Electrical Tools in stock.**

**The UNITED STATES ELECTRICAL TOOL Co.  
CINCINNATI, OHIO**

*Specify* ATLANTIC  
BAND SAW BLADES

*for*  
*smoother*

---

CONTOUR CUTTING



ATLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

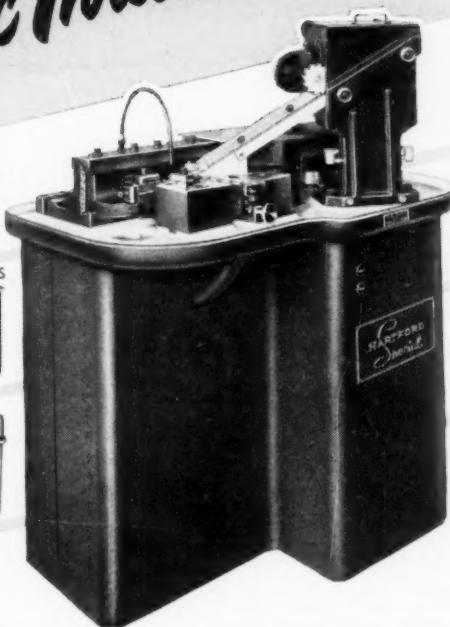
ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

*Atlantic Saw Mfg. Co.*  
INCORPORATED

Exclusively Manufacturers of Band Saw Blades  
153 Brewery St., New Haven, Conn.

**LOW COST — HIGH PRODUCTION**

**HARTFORD**  
*Special*  
**Automatic Thread Roller**



This Automatic Thread Roller is designed to solve standard and special thread rolling problems on small size screws from .086" to .190" in diameter with thread length capacity from  $\frac{1}{8}$ " to  $1\frac{1}{2}$ ", rolling consistently to Class 3 Thread Fit. Careful engineering and rugged construction make it capable of continued high production runs with startling economy.

The "Hartford Special" Automatic Thread Roller incorporates such outstanding features as Completely Automatic Feed, Filtered Lubrication System, "Table Top" Working Level, Vibration-Free Operation, plus many more.

Our engineering staff is always available to help you work out your thread rolling problems. Write now for complete information.

**HARTFORD**  
*Special*

Automatic Drilling and Tapping Machinery • Swaging Machines  
Die Polishing Machines • Contract Machine Work • Gears • Cams  
"Super-Spacers" • "Four-Point" Milling Vises • "V-Block" Milling Fixtures

**THE HARTFORD SPECIAL MACHINERY CO.**  
287 Homestead Ave., Hartford 3, Conn.

Please send me free Bulletin TR-100 describing your Automatic Thread Roller.

Name \_\_\_\_\_ Pos. \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

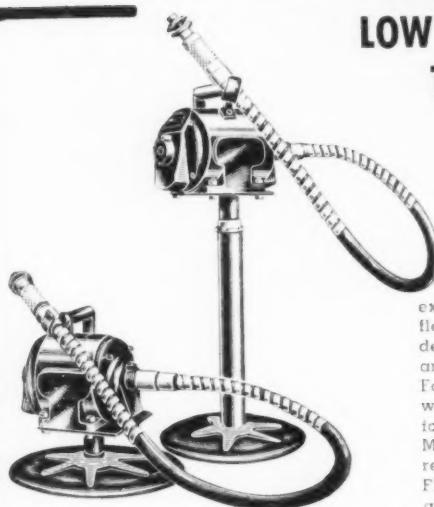
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# The New

SINGLE SPEED

# Econoflex . . .

## LOW PRICED UNITS BUILT TO PROFESSIONAL STANDARDS



Compare the new Econoflex with any other flexible shaft equipment on the market . . . and you'll decide on Econoflex which employs the same high quality materials and workmanship found in more expensive machines. Low prices on Econoflex are possible because of simplicity of design. Production economies thus effected are passed on to you . . . the buyer. The Econoflex is ideal for machine shops, home workshops, garages, tool rooms, etc. . . . for grinding, drilling, buffing and polishing. Made in 3 distinct mounts to meet individual requirements. Illustrated are the Bench and Floor Models. A Suspended Model is also available and is ideal where floor or bench space is lacking. Can be mounted on an Elliott pivoted bracket or on a trolley. Note the low prices below. Send today for full data, or order direct from this advertisement.

### NEW LINE NOW BEING INTRODUCED

CATALOG NUMBERS			GENERAL SPECIFICATIONS					PRICE	
Bench Stand	Floor Stand	Suspended Type	Motor H.P.	Shaft Speed	Flexible Shaft	Standard Handpiece	Approx. Wheel Cap	F.O.B. Binghamton	
BB-131	RB-131	SB-130	1.3	3450	3 8 x 5 ft.	BH-3I	4 x 1	\$ 83.50	
BB-151	RB-151	SB-150	1.2	2450	7 16 x 5 ft.	BH-3I	5 x 1	89.50	
	RB-171	SB-170	3.4	3450	1 2 x 6 ft.	BH-5I	6 x 1	101.50	

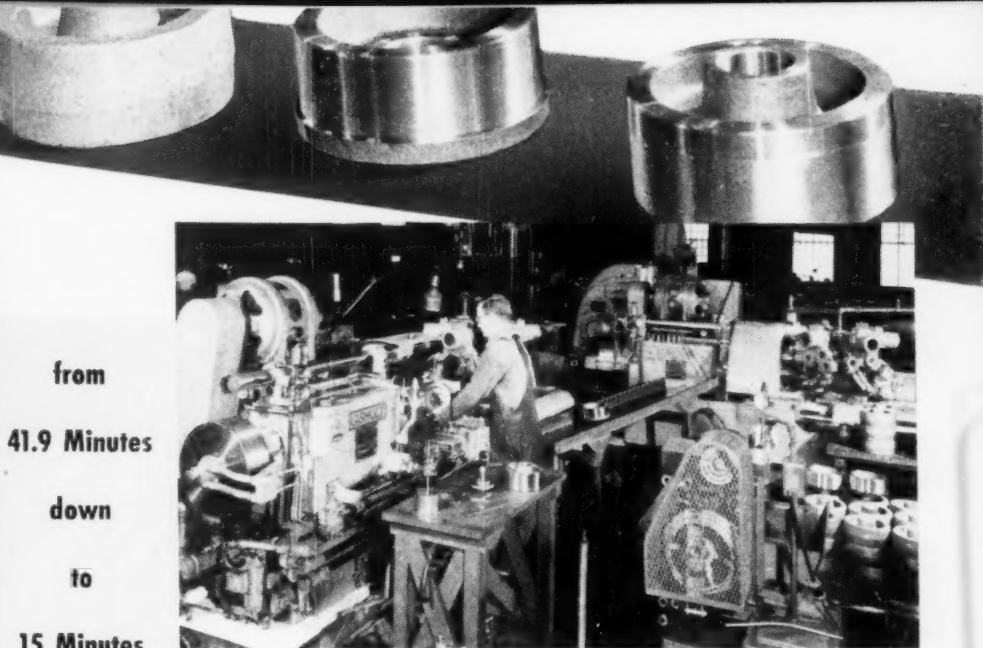
Note! These low priced machines will do 75% of the grinding jobs that can be done on any flexible shaft machines regardless of price!



## ELLIOTT MANUFACTURING COMPANY

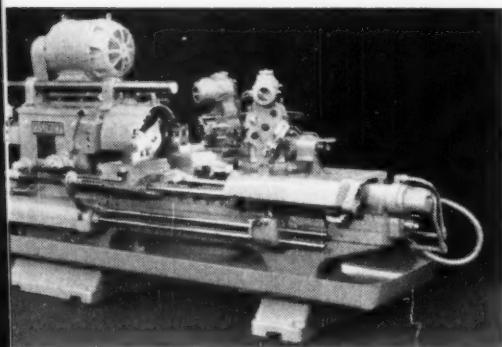
202 Prospect Ave.

Binghamton, N. Y.



from  
41.9 Minutes  
down  
to  
15 Minutes

## *That's Productivity* with the **GISHOLT FASTERMATIC**



The Gisholt Fastermatics are built in three sizes ranging from 21" to 36½" swing over bed.



### THE GISHOLT ROUND TABLE

represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

The cost of machining these gear blanks at the Falk Corp. took a sharp drop when the Fastermatics took over. Time was cut nearly two-thirds. Moreover, human errors were eliminated, thanks to Fastermatic's ability to hold close tolerances.

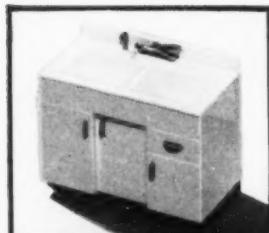
One operator tends 2 Fastermatics and a honing machine. Simple tooling makes it possible to handle 9 different sizes of gear blanks.

These modern automatic turret lathes enable you to handle a larger number of operations in one chucking—and cut costs to the bone on a wide variety of work. Ask for facts about them.

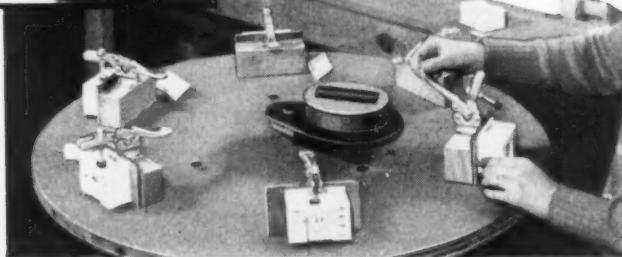
## **GISHOLT MACHINE COMPANY**

Madison 10, Wisconsin

RET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



"Model  
Tooling .."



Courtesy Ideal Models Co., Detroit, Mich.



## for Model Kitchens!

Six versatile De-Sta-Co Toggle Clamps save in this simple, economical, plastics cementing fixture. The turntable more than doubles production . . . eliminates the cementing cycle "bottleneck."

These perfect reproductions are for a manufacturer of metal kitchens. This operation, cementing on tops, requires: Fast cementing cycle—positive clamping pressure for a perfect bond—precise alignment for accurate assembly.

De-Sta-Co No. 225-U fills these requirements. Completely retractable when opened for quick insertion and removal of work, it offers the rapid toggle action, positive holding pressure and accurate performance that make De-Sta-Co Toggle Clamps ideal "Model Tooling".

For your working-holding problems in Assembly, Welding, Bonding, Machining, Inspection . . . of any materials . . . tool up with these economical, efficient, high-production examples of "Model Tooling".

De-Sta-Co Toggle Clamp Catalog describes more than forty stationary and portable clamps. Write for your free copy today.

# DETROIT STAMPING CO.

347 Midland Ave.

• •

Detroit 3, Mich.

# Cuts grinding time in half

## Savings pay for tools in 5 months



THIS manufacturer of materials handling equipment was using universal electric grinders when the Rotor Application Engineer called to find ways of cutting grinding costs. The Rotor Application Engineer recommended replacement with Rotor Air Grinders and demonstrated them with these results:

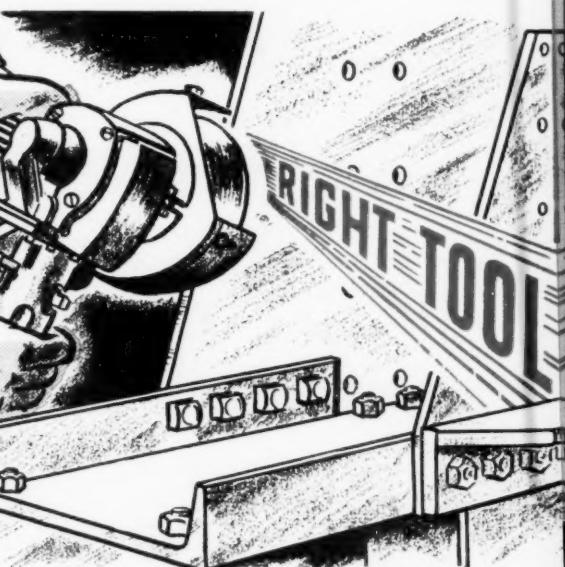
*Grinding time cut 50% due to greater cutting power and higher speeds.*

*Operating conditions improved with lighter-weight, cooler-running tools.*

*In labor savings alone, Rotor Air Grinders actually paid for themselves in 5 months.*

Similar possibilities may exist in your plant too. Call the Rotor Application Engineer for an unbiased analysis of your needs.

**AIR O'TOOL**



AIR

THE **ROTOR TOOL** co.

HIGH CYCLE

CLEVELAND, OHIO

UNBIASED ANALYSIS OF FORTIFIED TOOL PROBLEMS



### Torit F B Type Dust Separator



These units are designed to handle large volumes of dust, yet permit the cleaned air to be re-circulated into the room. In operation most of the dust is precipitated within the cyclone unit, while the residue is captured by the after-filter bag. Five sizes, from  $\frac{3}{2}$  to 5 H.P. are available.

### TORIT DUST COLLECTORS double up to cut costs in this grinding room

This installation started with one Torit No. 81 Dust Collector serving two surface grinders. Economies from this set up were so great that the company bought three more Torit Dust Collectors to replace the wet type central suction system previously used in this grinding room.

Compact and completely self-contained, Torit Dust Collectors fit neatly into present and future production layouts. Set close to the machine and operated simultaneously, they combine top efficiency with low power consumption.

Torit Dust Collectors for all standard grinding, polishing and cut-off machines are carried in stock. Special adaptations can be quickly made. For complete details, and the latest Torit catalog, write:

**TORIT**

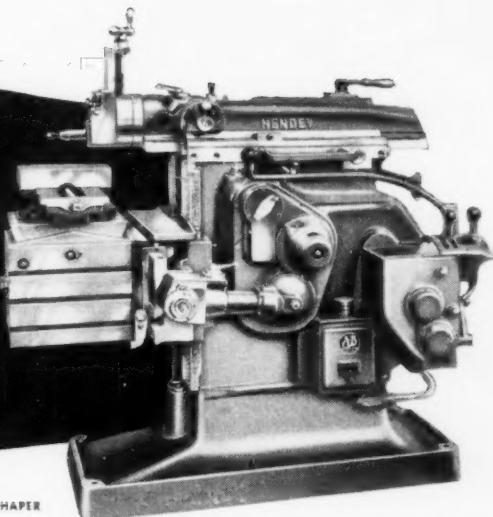
**Manufacturing Co.**

303 Walnut St. • St. Paul 2, Minn.

MACHINE and TOOL BLUE BOOK

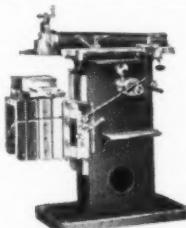
**...If you are not  
using Modern  
Hendey Machines  
you are not  
earning the  
profits that  
you should!**

**1950**  
**12" UNIVERSAL CRANK SHAPER**



A comparison of the old Hendey Friction Shaper with the NEW Hendey 12" Universal Crank Shaper will instantly reveal the profit possibilities that you may be missing. The modern Hendey Shaper offers the most complete, up-to-date shaper available today. Full standard equipment means that there are no "extras" to buy. This equipment includes table and vise for positioning and indexing work to any angle—

flanged mounted motor—mechanical controls on both sides—fully automatic lubrication—quick change swivel head—adjustable, preloaded Timken bearings on the bull gear. The 12" Hendey covers a range which makes it ideal for tool room and production work. Hendey Shapers are also available with capacities from 16" to 28", both standard and heavy duty. Write for full details on the modern Hendey Shapers.



**1920**

✓ Continuous, advanced engineering by Hendey is worth watching—and must be watched if you are to earn full profits from your lathes and shapers. For complete particulars and prices, contact your nearest Hendey office.

**Hendey**  
MODERN

Still using old 15" Hendey friction drive shapers? They have only 2 speeds, 21 and 30% strokes per min., as against 8 speeds from 14-200 for the new 12" shaper. Surveys prove that the new 12" Universal High Speed Crank Shaper covers a majority of all jobs in most plants. Mechanical changes are almost too numerous to mention—improved accuracy, speed and profits on the new 12" shaper will easily convince you of the advisability of changing now!

THE HENDEY MACHINE COMPANY  
MAIN OFFICE & PLANT TORRINGTON, CONN.  
BRANCH OFFICES New York, Chicago, Boston, Detroit,  
Rochester, Los Angeles, San Francisco  
REPRESENTATIVES Philadelphia, Cleveland, Pittsburgh

## Looking for savings?

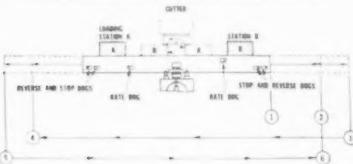
# 48% PRODUCTION BOOST REPORTED ON THIS OPERATION



Here's a Kearney & Trecker Chucking Table milling machine with automatic cycle and Mono-Lever Control giving a 48% boost to production of this worm wheel housing. Mono-Lever Control and automatic table operation is the answer.

### HOW JOE IS DONE

USING AUTOMATIC TABLE CYCLE AND MONO-LEVER CONTROL



1. Operator loads (A) and engages Mono-Lever. Table advances in rapid traverse to point of cut on workpiece (A) at (2).
2. Feed dog changes rapid traverse to selected table feed for cut on (A). Operator loads at station (B).
3. Upon completion of cut stop and reverse dogs reverse table in rapid traverse to point of cut on workpiece (B).
4. Feed dog changes rapid traverse to selected table feed on (B). Operator unloads and reloads at Station (A).
5. Stop and reverse dogs reverse table in rapid traverse to point of cut on workpiece (A).
6. Cycle repeats from (2).

Diagram shows setup for reciprocal milling. Operator engages Mono-Lever only once for entire run — spends the rest of his time loading and unloading workpieces. Table moves constantly; idle cutter time is at a minimum.

WHEN it comes to boosting production — there's nothing else like them. We mean Kearney & Trecker Milling Machines with Mono-Lever Control and Automatic Table Cycle.

Take a look at the job described here and the bar graph at lower left. See how these machines have cut milling costs for others 16% to 96%! Yes, and they can do the same for you!

Contact us or our nearest representative. Get proven facts on how Kearney & Trecker's milling machines with Mono-Lever Control and Automatic Table Cycle can cut your costs, increase your savings. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.



### COMPARE

Production by old method.

Production gain using a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle:

48%

### HERE'S GRAPHIC PROOF OF SAVINGS RESULTS

16% 16% - 49% 49% - 96%



- 1 The minimum over-all savings reported from any job when done on a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.
- 2 The majority of over-all savings from jobs done on these machines fall here.
- 3 Under favorable conditions, several jobs done on these machines have shown savings like this!



MACHINE and TOOL BLUE BOOK

# G uest Editorial



## **Questions to ask Mr. Purse-Strings**

Will money in the bank turn out products in a factory?

Will Government Bonds help reduce production costs?

Is liquidity any protection against obsolescence?

If your competitor gets out a better product at a lower price, how are you going to hold your customer? Offer them a strong cash position?

Would you retain in your investment portfolio a low-yield stock of obviously descending value; or would you

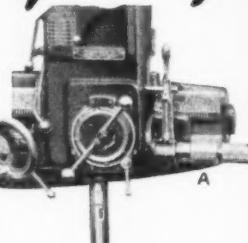
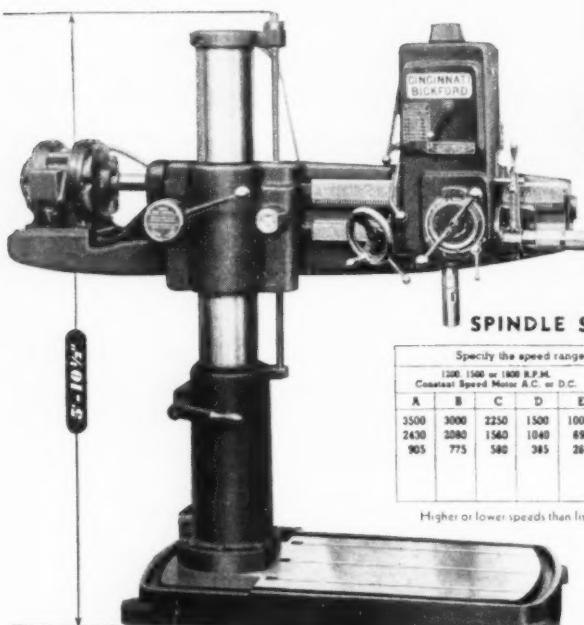
sell it and apply the proceeds to the purchase of a high-yield security with a future?

Which offers the greatest security — a company with a high-cost plant and cash reserves in the bank, or a company that has invested its cash reserves in modern machine tools in order to make certain it *has* a low-cost plant?

What good is money *unless it's put to work*?

Tell Berna, Gen. Manager  
National Machine Tool  
Builders' Association

# Safe... Simple... Speedy



Hand wheel is operated by left hand while right hand (grasp A) controls advance and return of spindles and automatically controls direction of spindle rotation.

## SPINDLE SPEED RANGES

Specify the speed range (by letter) that meets your needs									
1300/1500 or 1800 R.P.M. Constant Speed Motor A.C. or D.C.					900/1000 R.P.M. or 750/1100 R.P.M. Two Speed A.C. Motor				
A	B	C	D	E	F	G	H	I	K
1500	3000	2250	1500	1000	2500	3000	2250	1500	1000
2400	2000	1500	1040	695	2430	2000	1500	1040	695
905	775	580	385	260	1750	1500	1125	750	500
					1215	1040	780	520	345
					905	775	580	385	260
					450	385	290	190	130

Higher or lower speeds than listed above are available on special order.



New distinctive features which reduce mass production costs are found in this simplified high-speed Cincinnati Bickford 7½" diameter, 2½" arm Super Service Radial.

You save in power, floor space, and in initial investment. You get a machine that gives the operator maximum ease and speed in handling.

The machine is sturdy, and will give continuous high production.

Write for Bulletin R-26A. It is completely illustrated and gives a complete description.



Radials 7½" dia. col. 2½" arm. to 26'  
dia. col. 12" arm.  
General purpose Uprights. 21" to  
28" sizes.  
Production Uprights. 21" to 28"  
Jig Boxes, Portable Horizontals,  
Splicing Table Machines

Equal Efficiency of Every Unit  
Makes the Balanced Machine

**THE CINCINNATI BICKFORD TOOL CO.** Cincinnati 9, Ohio U.S.A.

# *As the* . . . **editor** **SEES IT** . . . . .

## HOW DO WE RUN OUR BUSINESS?

By hit or by miss? By making one decision today and another one tomorrow? By alternately blowing cold and hot and then, when the business gets a chill, blowing lukewarm?

Silly questions, you say. And they are.

We run our business by policy. By well established, tried and tested methods do we handle the various departments of our business efficiently and economically.

Each business has a positive sales, purchasing, and advertising policy. Rules and regulations govern the functions of personnel, production and manufacturing and who knows how many other administration and production departments.

American business even has a policy regarding replacement of machines. A policy of not having a replacement policy.

The average manufacturer today does not have a clear-cut policy regarding the replacing of worn out machines. Machines are run according to a book value and not according to their output. Whether a machine turns out 100 parts a day or 500 does not make much difference as long as the machine functions and turns out its 100 parts. And a machine that operates need not be replaced whether it operates at a profit or a loss.

Years ago executives used roll top desks and worked by gas light. When a letter was to be written it was done by a clerk who "wrote a fine hand". Roll top desks, gas lights, and fine penmanship have been replaced. Policy was at work in these instances.

But machines have not been replaced. The majority of shops today are cluttered with old clunkers of the gas light era. The only thing that's kept most of them running is the invention of scotch tape. They have not been kept in operation because they paid their own way. No indeed, they are kept in operation because there is no clear-cut policy which will determine when they should or should not be replaced. This lack of a clear cut replacement policy which causes business to hang on to these Zombies is expensive for business:

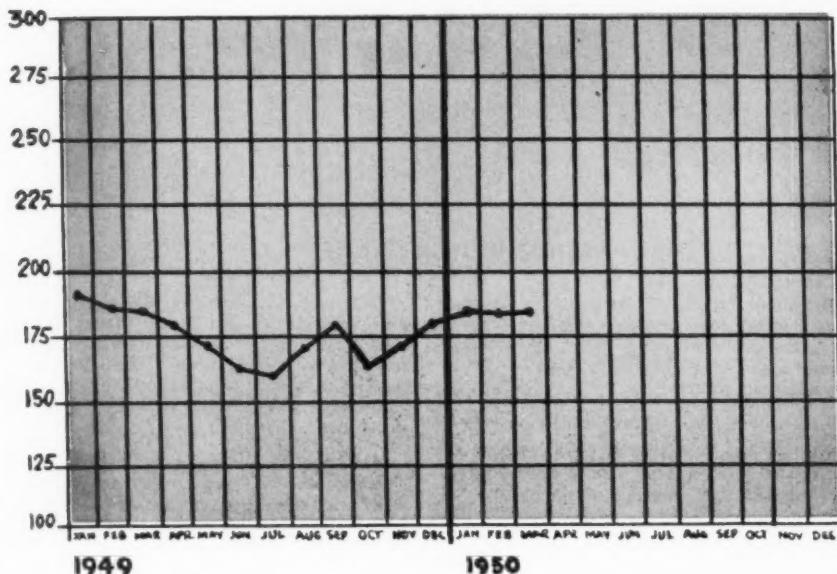
- it lowers productivity,
- it accounts for a high wage output ratio,
- it means a higher selling price,
- it causes the deterioration of the value of the business.

American business urgently needs a replacement policy. Future profits of a business depend on the policies which are made today.

*William F. Schleicher*

# HOW'S BUSINESS?

## TOTAL INDUSTRIAL PRODUCTION INDEX A comparison between 1940 and 1950



source: Department of Commerce

base: 1935-1939 = 100

### FREIGHT CARLOADINGS TO BE UP IN SECOND QUARTER

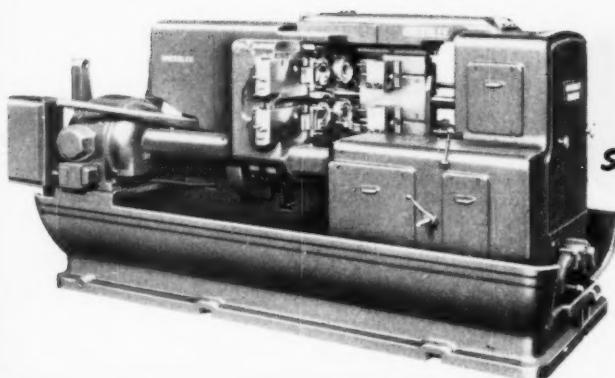
Freight carloadings in the second quarter of 1950 are expected to be 1.4 per cent above those in the same period in 1949, according to estimates just compiled by the 13 Regional Shippers Advisory Boards and made public today.

On the basis of those estimates, freight carloadings of the 32 principal commodity groups will be 7,753,700 cars in the second quarter of 1950, compared with 7,645,794 actual carloadings for the same commodities in the corresponding period in the preceding year. Seven Shippers Advisory Boards estimate an increase and six estimate a decrease in carloadings for the second quarter of 1950 compared with the same period in 1949.

The Shippers Advisory Boards expect an increase in the second quarter of 1950, compared with the same period one year ago, in the loading of 17 and a decrease of 15 of the commodities listed.

### MACHINE TOOL SHIPMENTS

Machine tool shipments show a slight drop in February over January. Total new orders for February were 88.7 as against 99.7 in January. Incidentally, the January figure is the highest for several years. The February figure is higher for



## 4 SPINDLE

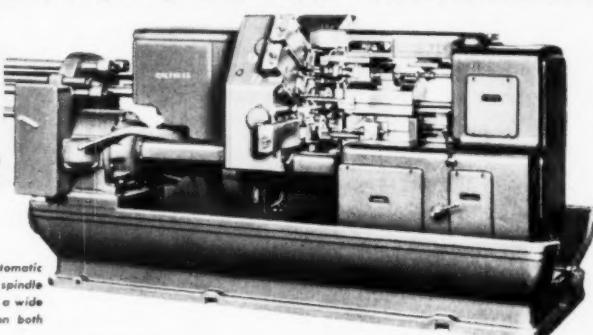
### THE GREENLEE "FOUR"

A heavy-duty automatic made in 1½" and 2½" spindle capacities. The "Four" incorporates all the cost-cutting features of the well-known "Six" (see below).

# GREENLEE

## AUTOMATIC SCREW MACHINES

## 6 SPINDLE



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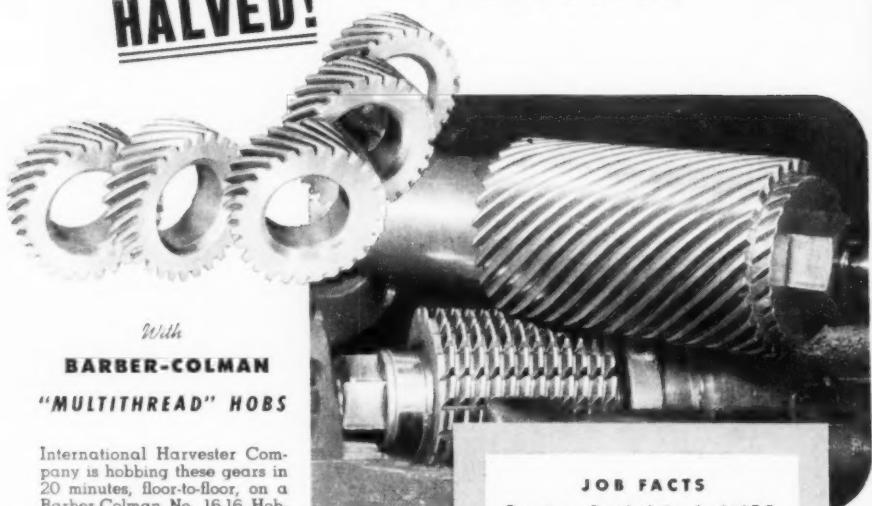


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Hobs — B-C Double Thread  
4" x 4" x taper bore  
Fl-to-Fl — 20 minutes per load  
Feed — .051" rev. Speed — 139 RPM  
Tool Life — 200 pieces per sharpening

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#### MORE FACTS

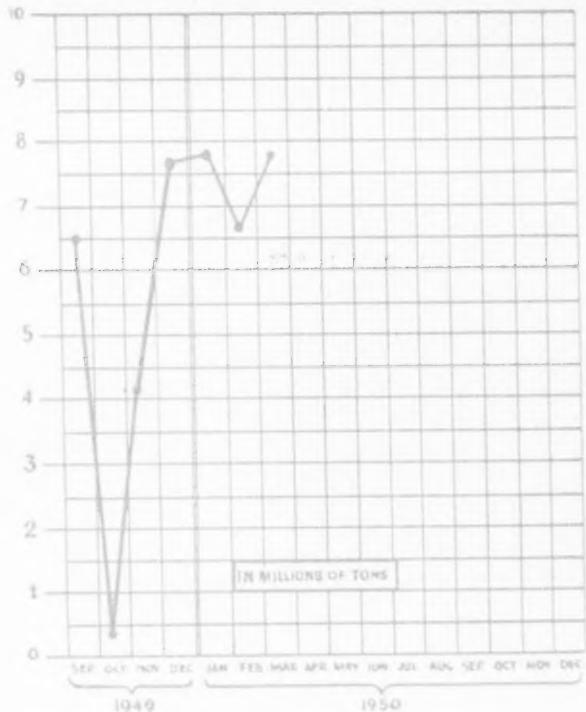
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MACHINE and TOOL BLUE BOOK

## TOTAL STEEL PRODUCTION CHART

A quantity comparison between 1949 and 1950



source: American Iron and Steel Institute

any month during the last two years with the exception of March, 1949, when the figure stood at 93.5. Foreign orders show a drop in February of from 26.7 in January to 18.8 in February. (Average Shipments 1945-1946-1947=100%)

### INDUSTRIAL PRODUCTION IS UP

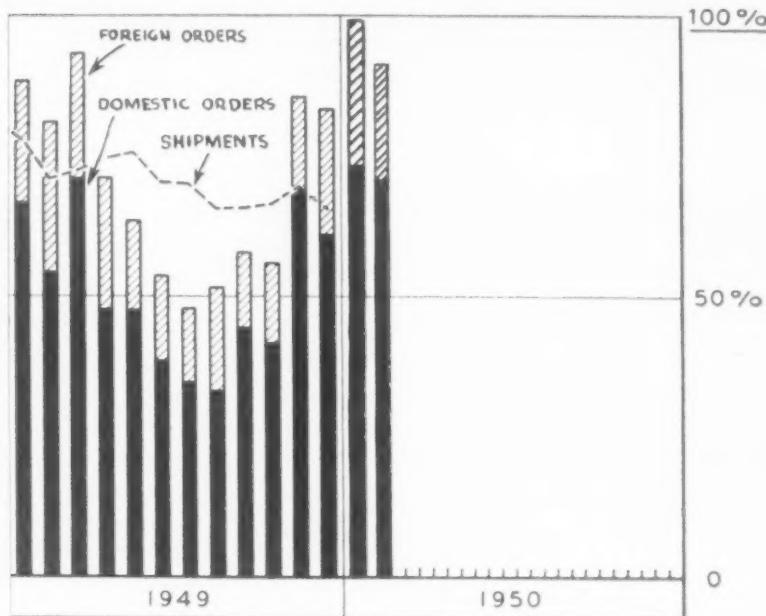
It is estimated by the Federal Reserve Board that industrial production for March will be close to 183% of the 1935-1939 average. This is still an estimate and may be revised slightly; however, all indications are that the March index will be up over February when the index of industrial production reached 180%. The decrease in February over January's 183% was caused by the coal strike and its effects on general manufacturing.

The March figure of 183% is a considerable improvement over last summer's low of 161%.

### UNEMPLOYMENT CLOSE TO 5 MILLION

Unemployment is approaching 5 million and unless business activity picks up substantially will continue to rise. Reason for the rise in unemployment is the growth of the labor force during the last five years and the inability of business to absorb the influx of new labor. Further, the increase of man-productivity of 2 to 2.5% a year has limited new labor from finding work. No government interference is anti-

**MACHINE TOOL SHIPMENT CHART**  
 An indexed quantity comparison between 1949 and 1950



source: National Machine Tool Builders' Association

cipated unless the unemployment figure reaches above 5 million. Some sources say, and they base their conclusions rightly or wrongly on the present trend, that unemployment may reach as high as 11.5 millions by 1954. The following chart may be of interest to students of the labor trend.

**Trends in Labor Force and Unemployment**

	Total Labor (thous.)	Unemployment (thous.)	Unemployment As Per Cent of Labor Force
1900-08	33,497	1,909	5.7%
1909-18	40,374	1,366	3.4
1919-28	45,254	2,505	5.5
1929-38	52,193	8,787	16.8
1939-48	60,986	3,508	5.8
1946	60,820	2,270	3.7
1947	61,608	2,142	3.5
1948	62,748	2,064	3.3
1949	63,571	3,395	5.3

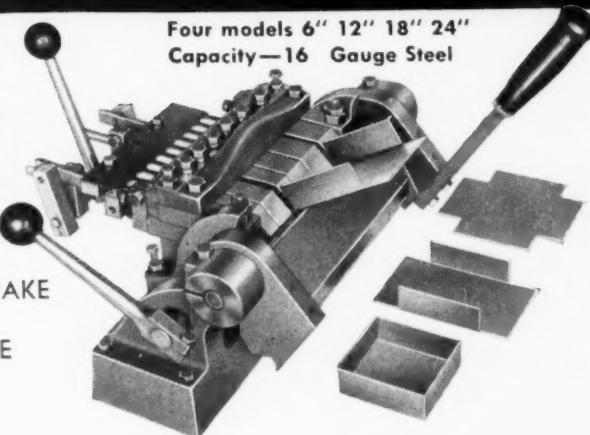
Source: Bureau of Census; earlier years, partly unofficial.

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# *Tool Control Program*

## SPEEDS WORK, CUTS TOOL SPOILAGE

by

John P. Wilkinson.

Assistant to the Works Manager, The Lewis Foundry & Machine Div., Blaw-Knox Co.,  
Pittsburgh.

While the number of pieces machined at this company is not large, the amount of metal removed from each part is equal to a large run of small parts. Carbides are used exclusively at Lewis where their use has greatly increased production and reduced machine down-time. The tool design and application is under the administration of a "carbide coordinator" whose job it is to coordinate the entire tooling and metal removing process at Lewis.

**D**OES COORDINATED tool control pay in a plant where production lots rarely consist of more than half a dozen identical pieces? The answer, based on our experience here at Lewis Foundry Division, definitely is "yes".

Among the gains achieved, effective in materially reducing production costs are:

1. Greatly reduced machine down-time for tool changes and tool resetting.
2. Reduction in tool spoilage to a negligible amount.
3. Higher productivity for the plant as a whole due to the higher output rates obtained per machine-hour, day, or week.

The primary Lewis Foundry products are rolling mill rolls and auxiliary machinery. Most of these rolling mills, figure 1, are custom-built, requiring that component parts be produced in very small lots. Seldom do we run through more than half-a-dozen identical pieces.

Chief machine tool types used at Lewis Foundry are turret and engine lathes, boring mills, milling machines, and shapers. One of the interesting things is that most of our machines are now continuously tooled with carbides. This has been a natural result of following an adequate tool control program, a program which insures the reduction in costs and increase in machine output made possible by carbide tooling.

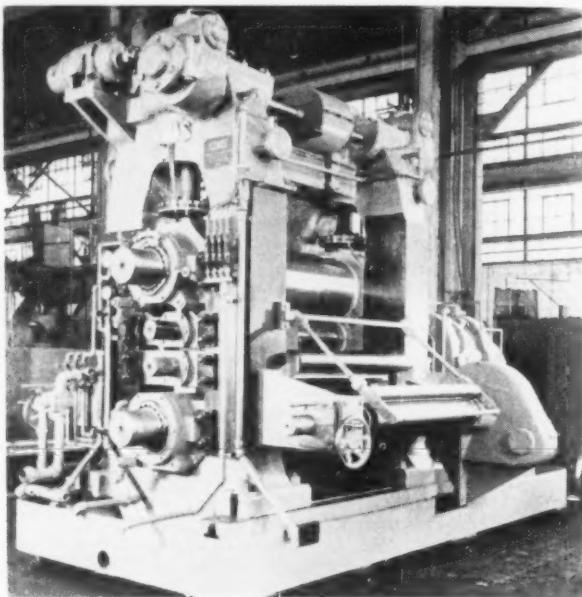


Fig. 1. Typical of Lewis Foundry products is this complete rolling mill unit. Most Lewis rolling mills are custom built, requiring that component parts be produced in very small lots. Carbide tools were used on 90% of the machining operations.

It should be understood, however, that while the number of pieces of any one kind is not large, even the machining of a single part, figure 2, may involve as much metal removal as a fairly good sized run of small parts due to the size of most of the rolling mill components.

As a result we gain just as much, if not more, from the longer life between grinds of carbide tools as would be the case if we were machining longer runs of smaller parts. The carbide tools simply eliminate most of the machine down-time for sharpening and re-setting of tools and thus give us "continuous machining". In addition, the productivity is further increased by the higher cutting speeds of which the carbides are capable.

Today practically 90% of our machining is done with carbides and our tool supervisor is thus also a "carbide coordinator" to all practical purposes, figure 3.

The Carbide Coordinator's administrative superior is the Works Manager. However, the Carbide Coordinator is also responsible to the Machine Shop

Superintendent for tool design and application, and to the Storeroom Supervisor and the Purchasing Agent for tool requisitioning and inventory control. The Carbide Coordinator's area of responsibility on cutting tools also embraces trouble shooting and supervision of tool maintenance.

His background includes experience as machinist, toolmaker, and tool engineer. He also received intensive training in all phases of carbide tooling at Carboloy Training School in Detroit.

#### STANDARD TOOLS PLUS TRAINING GIVE EFFECTIVE APPLICATION

The short runs at Lewis Foundry do require some differences in the handling and selection of tools for any one job. Each machinist has, at his machine, a representative supply of standard carbide tools, from which he makes his selection. It has been found quite practical to train our machinists, most of whom are highly skilled and have had wide experience, to select their own tools, since:

- (a) The grade of Carboloy cemented carbide to be used on any given

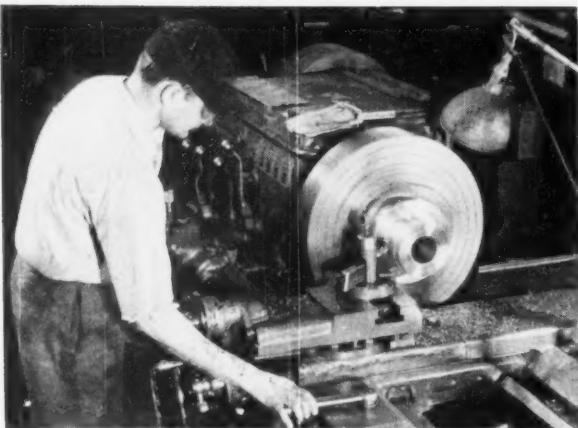


Fig. 2. Lewis Foundry's machinists are carefully trained on the job in good carbide tooling practice. Here, an operator turns out the male half of a coupling from cast steel, using a standard Carbolyt tool, Grade 788.

material has become fairly well established over a period of time. (b) The style of tool to be used on various types of jobs has also been standardized.

This procedure eliminates waiting time for tools, from stock or from grinding.

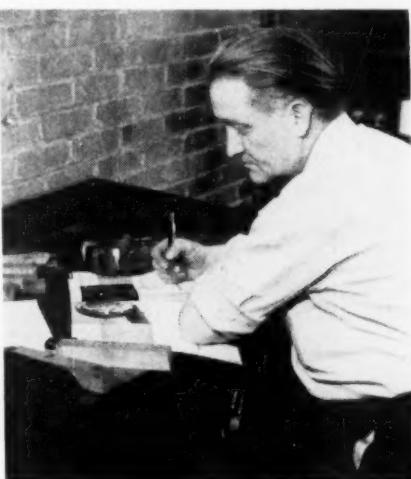
The machinists have also been trained to set up their own jobs, including feeds and speeds. If any difficulty or new problem is encountered the machinist or his foreman calls on the Carbide Coordinator for assistance. This provides further opportunity for the Coordinator to add to the "carbide know-how" of the operator. This informal yet continuous "on the spot" training of shop men has proved highly effective.

While each man has plenty of latitude in the use of his cutting tools, any unusual breakage or unsatisfactory tool performance is reported to the Carbide Coordinator. The Coordinator also has the authority to effect changes in the tooling or in the speeds, feeds, and depths of cut, figure 4.

Fig. 3. All activities related to the carbide tooling program at Lewis Foundry are the responsibility of the Carbide Coordinator, who works cooperatively with various department heads. His responsibilities include tool design and requisitioning as well as carbide application, trouble shooting, maintenance, and inventory control.

#### SIMPLIFIED TOOL DISBURSEMENT

It has been found unnecessary to set up "tool numbers" due to the extensive use of standard catalog-listed Carbolyt tools, stamped by the supplier with catalog number and catalog grade. When a new cutting tool is required, it is drawn from a small supply stored at the grinding crib service window, located between the grinding crib and the main storeroom. The tool is charged to the machine rather than the operator, the tool number being noted opposite the machine number on a master chart. This chart lists all machine tools



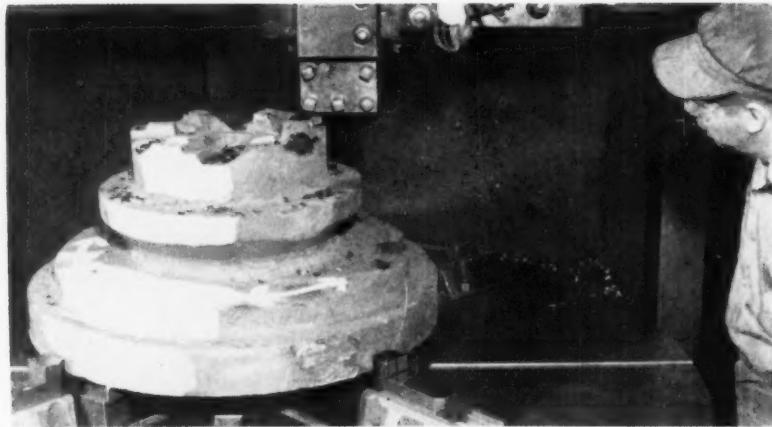


Fig. 4. The Carbide Coordinator at Lewis Foundry makes periodical checks on the handling of tools by machinists. Much of the production at Lewis is large, heavy work such as this huge clutch. Facing the 6 teeth of this cast steel part presents a tough, interrupted cut calling for Carbolyte Grade 78C tools.

in the shop and the tools assigned to each.

The Carbide Coordinator frequently studies this record of tools issued, especially when the master chart is replaced at the end of each month, for evidence of any excessive distribution or use of tools. When such evidence is found, he traces down the cause and eliminates any unfavorable conditions. This procedure serves as a check on possible improper tool handling practices before any sizeable loss could result.

#### PERPETUAL INVENTORY MAINTAINED

Tool inventory consists of an "active" and a "reserve" supply, the active supply being maintained in the grinding crib. When the crib attendant's supply of active tools requires renewal, he fills out a Materials and Supplies Storeroom Requisition, which is countersigned by the Carbide Coordinator. This form is turned over to the main storeroom in exchange for the required tool or tools drawn from the reserve supply.

Reserve stocks are maintained in the main storeroom. The storeroom clerk keeps an inventory chart listing each standard carbide tool carried in stock

(85 different catalog listed tools), and the balance-on-hand for each. In addition to this running total, each bin label is marked with an established minimum and maximum quantity, between which figures the stock is to be maintained, figure 5.

Each time that tools are transferred from reserve to active stock, the clerk refers to the inventory limits posted on the bin label. When the stock falls below the minimum or re-order point, the clerk checks the running total on the inventory chart against the actual number of tools in the bin. A memo to the Storeroom Supervisor informs him of the need to re-order and the Supervisor sends a requisition to the Purchasing Agent for the number of tools required.

#### INVENTORY LIMITS ARE CHECKED

Minimum and maximum tool stocks are based on an "average one-month's" usage, plus an allowance for anticipated delivery time. Once a year, a plant-wide physical inventory is taken, at which time the tool inventory limits for each tool number are re-studied by the Storeroom Supervisor and the Carbide Coordinator.



Fig. 5 For efficient tool handling, a reserve stock of tools is kept in the main storeroom. Each bin is labeled with the maker's catalog number and minimum and maximum inventory limits.

Minimum tool stocks are determined by the average number of a given tool consumed while a re-order is being processed and tools delivered, plus an arbitrary safety cushion to provide for unusual production activity.

Maximum tool stocks are calculated by adding 1/12th of a total year's consumption of the tool to the minimum quantity.

In the case of the "less active" tools,

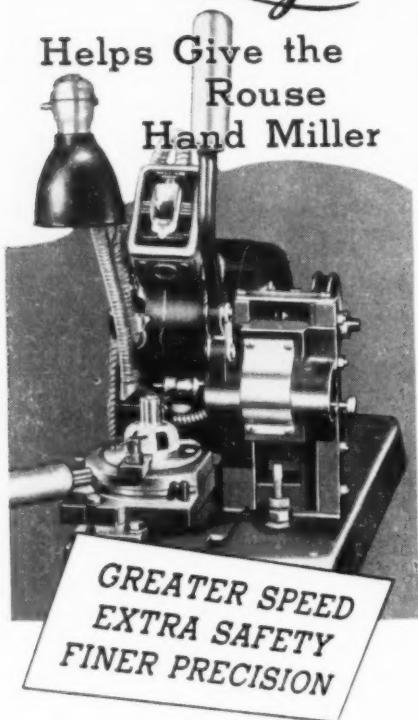
i.e., monthly consumption less than 5, the figures are modified to provide, in general, a minimum of 5 and a maximum of 10. Stocks are also modified by the Carbide Coordinator when tools' styles have become obsolete for general plant use; or when new applications have been added for certain tools, thereby creating a greater shop demand for them. The minimum and the maximum figures may also be altered

Fig. 6. All reconditioning of cutting tools is handled in a centralized area where men who specialize in the grinding of carbides are available.



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### CENTRALIZED TOOL GRINDING PAYS OFF

Although standard carbide tools are used almost exclusively on single point applications, some of the jobs require slight changes from the standard cutting edge angles, nose radii, or other details. These tools are permanently assigned to a particular machine, and are maintained in the tool stock at the machine.

Tools to be sharpened are delivered to the centrally-located service window between the grinding crib and the main storeroom. The tools are ground, returned to the window, and picked up by the machinist.

All cutting tools, single point and multi-point, are serviced at this one grinding crib, figure 6. Here, adequate equipment is maintained in proper condition for precision grinding, and the services of men specifically trained in grinding carbides are instantly available.

Tools to be sharpened are delivered to the centrally-located service window between the grinding crib and the main storeroom. The tools are ground, returned to the window, and picked up by the machinist.

Equipment includes a two-wheel 14' machine for snagging steel shanks; a double-headed 10" and a 6" carbide grinder; and a chip-breaker grinder. Carbide face mills are sharpened on a universal grinder. Other grinders are provided for sharpening other milling cutters and miscellaneous tools. Since standard tools are so widely used, and since special tools are needed only occasionally, practically all tool fabrication equipment has been eliminated.

Grinding crib operators work directly under the Carbide Coordinator. Personnel includes one attendant on each of three shifts, three grinder hands on the first shift, two on the second, and one on the third.

This centralized tool grinding program has reduced tool spoilage to negligible amount — and continually keeps it at a minimum.

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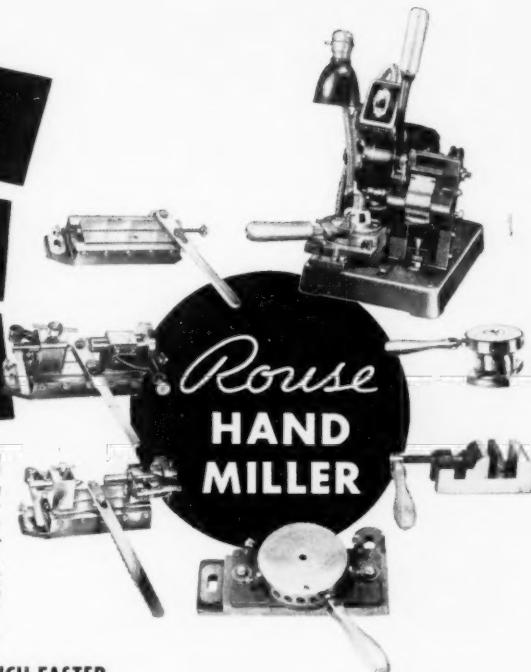
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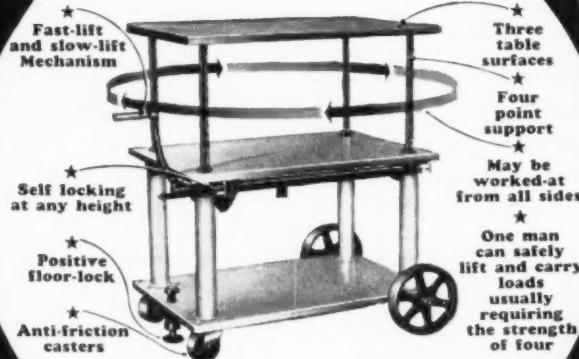
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# *Developments in Diamond Tools*

## DURING THE LAST FIVE YEARS . . . part 2

by Paul Grodzinski, A. M. I. Mech. Eng., London



Diamond powders, paste, and diamond grinding wheels are discussed in this, the second and last instalment of Mr. Grodzinski's series on diamonds. The uses of various grinding wheels in the glass and stone industries are described. Of interest is the description of the various classes of diamond grinding wheels which are on the market today.

### DIAMOND POWDER:

The last years have seen a greatly increased use of diamond in the form of graded powder from 80 mesh down to 0.5 micron size, used either in loose form or bonded into grinding wheels; about 60% of the diamond production by weight seems to be used in this way.

Diamond powder as an abrasive has been in use for a long time. It was employed for polishing diamond itself other gemstones. Mechanics used it to a limited extent for lapping hardened steel parts. The use for grinding wheels was sometimes considered, but the raw material was too expensive. For instance, the first thread grinding operation on hardened screw gauges was performed in a lathe on a rapidly revolving steel disc provided with diamond dust. That this method could not make much progress was probably due to the poor grading of diamond dust and probably contamination with other abrasives which lead to scratched surfaces.

The closely graded and cleaned diamond dust is only a development of the last twenty years and still improvements seem to be necessary. Down to about 300 to 400 mesh standardised sieves are available and therefore the production of powder down to a grain size of 40 to 50 micron does not represent difficulties. For fine grain sizes, however, use must be made of

different methods, as sieves of finer mesh-size are not available. Mesh-sizes of 500, 600, 800 or even over 1000 as quoted sometimes in literature or catalogues may be called correctly "hypothetical sieve sizes," and it is best to quote all sub-sieve sizes in grain sizes of micron (0.001 mm. -- 0.00004 in.) as measured under the microscope. It can be distinguished between dry and wet methods of separation. The former does not seem to be developed for grain sizes below 10 micron. In the wet methods one distinguishes between sedimentation (separation by settling from a fluid) elutriation (separation by a rising fluid) and centrifuging (a newer separating method). Further efficient methods for cleaning have been established. Standards for diamond powders have been created in Germany (DIN 848) and America (CS 123-1949, a revised edition of the 1945 standard).

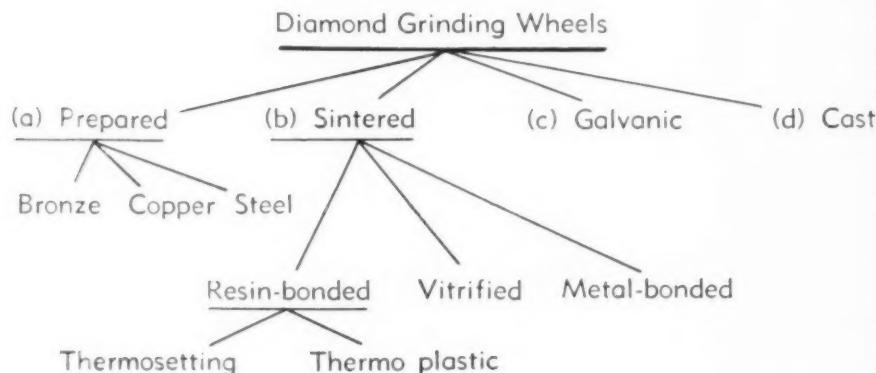
#### DIAMOND PASTE

Recently a number of diamond pastes or diamond compounds have come on the market and are apparently applied widely. The reasons are that the diamond powders contained in them are closely graded (mostly according to national standards such as the U.S. Commercial Standard CS 123). The fluid used holds the powder in the desired dispersion and the dispensing means

(collapsible tubes, syringes, etc.) allows the most economic use of the paste. In addition, usually a color scheme is applied to differentiate between different grain sizes. It may be pertinent to re-bark that actually the use of a prepared paste is the oldest application of diamond dust in engineering industries, of course, usually a simple suspension of diamond dust in olive oil was supplied. Most probably objections against this method were ventured by the users (a) against the grading and purity of the diamond and (b) against the actual diamond amount contained, thus compelling the producer to supply diamond dust in finely graded and cleaned form and in an accurately stated quantity. To achieve some standard in this respect quite a number of years passed during which the consumer had to prepare his own paste and of course encountered difficulties owing to suspension means and proper diamond concentration. This led practically to the re-invention of the idea to supply diamond powder pastes to the consumer directly.

A modern high grade diamond paste or compound is no longer a simple mixture of a vegetable oil, say olive oil, with diamond powder, but a scientifically made compound of (a) a wetting and dispersing agent, (b) a carrier for

### Types of grinding wheels



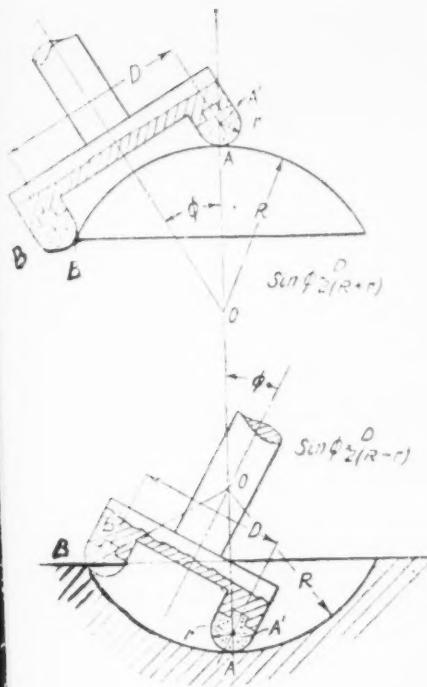


Fig. 1. Principle of generating spherical lens blanks. (a) convex, (b) concave.

• • •

maintaining a relatively permanent and uniform suspension of the diamond, (c) a plasticizer to attain a desirable consistency in b, (d), a dye or coloring matter to distinguish between different diamond grades.

The special advantages of a light coloring agent are that when the compound comes to action the abraded chips discolor the compound and thus indicating the working.

Some firms supply the pastes in three grades: standard, medium and heavy concentration. Producers do not state the actual diamond contents and the customer has to have the confidence that an equivalent amount of diamond grain has been supplied. This, of course, is a step in the backward direction, compared with the method in supplying a distinct quantity of correctly

graded diamond powder by weight. However, the reputation of the firms concerned and the competition guarantee that the compounds will contain adequate amounts of closely graded powders.

#### APPLICATIONS OF LOOSE DIAMOND DUST

Diamond dust has to be used in paste form or has to be prepared by the consumer himself. Formerly the suspension in olive oil was recommended exclusively. Since this was scarce during the war years, in America, a substitute mineral oil was developed, whereas in England use was made of other vegetable oils, such as rape oil, nut oil, etc. Very good results have been obtained by using cyclohexanol and carbon tetrachloride as a suspension for diamond powder.

Whilst it is general knowledge that sintered carbides consisting of tungsten carbide and titanium carbide crystals, bound by a soft matrix, generally cobalt, need for grinding and polishing a harder abrasives than aluminum oxide and silicon carbide i.e., diamond, only recently has it been realised that for a high grade polish of softer metals, finely graded diamond dust is an excellent medium. Numerous metallographic laboratories have now found suitable methods of polishing difficult metal samples with diamond dust, using different methods; for instance, diamond on a felt pad or on a wooden lap.

#### DIAMOND GRINDING WHEELS

Considering only types of wheels which are on the market at present, diamond grinding wheels can be obtained, which have been produced by the following basic methods:

(a) Prepared by hammering or pressing diamond powder in a metal surface (bronze, copper or steel), perhaps subjecting it later on to a heat treatment.

(b) Sintered (using this expression in a somewhat extended sense) by mixing a powder (resin, ceramic composition, metal) with diamond and sintering the mass under heat and pressure.

(c) Galvanic bonding (electroplating) diamond grains to metal bodies.

(d) Casting diamond grains into metal to form diamond metal aggregates.

Each of these four main types and

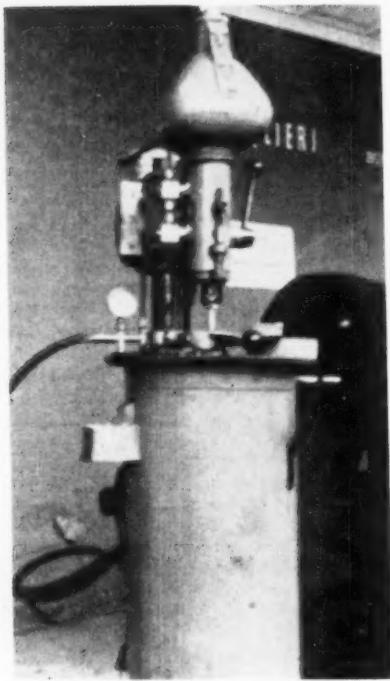


Fig. 2. Italian TOR machine for drilling glass and other materials from both sides.

• • •

sub-types have their particular characteristics which cannot be discussed here in detail. Method (a) is mainly used for sawing or slitting discs, but can be applied successfully to other surfaces, such as straight grinding wheels and bull-nose tools. Methods may be preferred in which the cuts in the surface are produced by stamping rather than by cutting or milling with small toothed milling cutters. Whereas in the latter case material is removed, which later on is necessary for embedding the diamond grain, in the case of stamping by hand or suitable machinery, no material is removed and a burr thrown up, which helps to embed the diamond grain.

The first diamond wheels made according to method (b) were resin bonded wheels, which are successfully applied till today; they were followed by the metal bonded wheels, and the

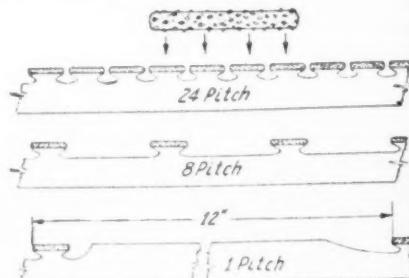
most recent wheels are the vitrified ones. Since the vitrified wheels seem to combine the advantages of both the resinoid and the metallic types, some manufacturers hope that these wheels may at a not too distant future, replace the two other types.

One of the difficulties in many diamond wheel applications is the dressing of the wheel face when it has been glazed. Manufacturers usually suggest rubbing with a pumice stone or silicon carbide stick and in extreme cases rubbing the wheel face over a water-silicon carbide mixture spread on a glass plate. Recently in several instances, the use of a coarse grained silicon carbide grinding wheel has been advocated rotated by the diamond wheel itself, or having a high speed drive. Occasionally good results have been obtained by slightly etching the wheel surface in diluted nitric acid and neutralising the effect of the acid by ammoniac treatment.

It may be mentioned that during the last years, numerous patents were issued in which the use of thermoplastic resins for diamond grinding wheels was recommended but only relatively recently have such wheels come on the market and proved very efficient in grinding glass lenses. In these instances, the operation is carried out with a plentiful supply of water and therefore heating of the mass is entirely prevented. In America the manufacturers of diamond grinding wheels have accepted the standard grinding wheel

• • •

Fig. 3. The three different diamond band saw types and form of insert used on the DoAll contour sawing machine.



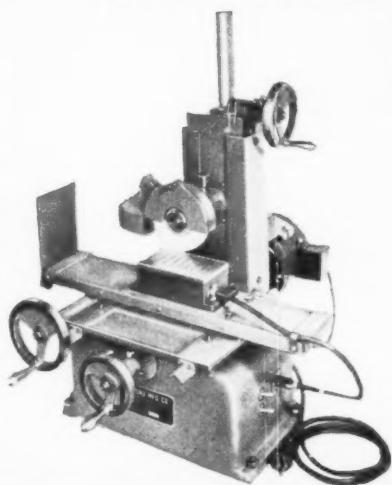
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markings and therefore the mark contained on the wheel already gives more information about grain size, hardness, kind of bond, concentration, etc. This seems the first step for a standardisation of diamond grinding wheels which seems to be very desirable. It may be mentioned that the diamond concentration usually stated on diamond grinding wheels, only refers to the particular brand and no conclusions on the actual diamond content can be drawn, as well as comparison of the performance of other products.

**DIAMOND GRINDING WHEEL APPLICATIONS**

The following short survey is classified according to the material to be machined:—

**Glass and quartz:**—Diamond grinding wheels are used in the glass industry for the following four main purposes:—  
(a) sawing larger glass blocks; (b) rounding glass blocks (glass edging);  
(c) lens generating; (d) drilling or trepanning of holes.

(a) **Glass sawing** is a basic operation which can be economically carried out with diamond impregnated sawing blades of 6 to 12 in. diameter on modern, improved machines, replacing the old machines with swinging work-holder.

(b) **Glass edging machines:**—The advantage of using diamond grinding wheels in glass edging machines is that the pre-set dimensions are maintained for very long periods so that automatic machining without interruption is possible. Recent improvements included self-centering glass edging machines in which the lengthy 'pitching' of the glass lens and optical centering is replaced by clamping the lens blank between brass cups, figure 1. This method is, of course, mainly useful for convex lenses. Similar improvements have been made with glass edging machines for spectacle glasses which are formed according to a profile grinding operation. Hitherto the bevelling of these lenses with diamond grinding wheels represented some difficulty.

(c) **Lens Generating:**—One of the most spectacular developments is the use of diamond grinding wheels for lens generation using either the so-

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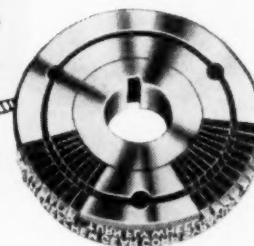
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called generating method by means of a bull-nose tool rotating at an inclined axis of the workpiece or using the customary spherical grinding method by replacing the cast-iron body by a diamond grinding wheel. Great success has been achieved. The pre-grinding of a prescription lens may take only 30 seconds, whereas the finish grinding takes 45 seconds, after which the lens is ready for polishing. Polishing has still to be done in the customary way by means of rouge. For the production of toric i.e., lenses with two different radii in axis perpendicular to one another also great improvements have been made which to a large extent have been made possible by the application of diamond grinding wheels.

(c) **For glass bevelling** a transportable grinding machine flexible shaft has

been developed by Flextol Ltd., which allows to bevel large glass plates.

(d) **Glass drilling and trepanning:**— Whereas hitherto for very small diameters glass drills of a shaped diamond were used, glass drills made by sintering or electro-plating processes are now available down to  $3/32$  in. diameter. These drills are time and power saving as usually a core is produced. Such drills with relatively a thin rim of impregnated diamond are produced up to relatively large diameters and many operations have been facilitated. Recent advances in machines are drilling machines which drill from both sides such as the Italian Tor machine, figure 2.

#### Stone sawing:—

An absolutely new development has been initiated by the design of a diamond band saw by the DoAll Company

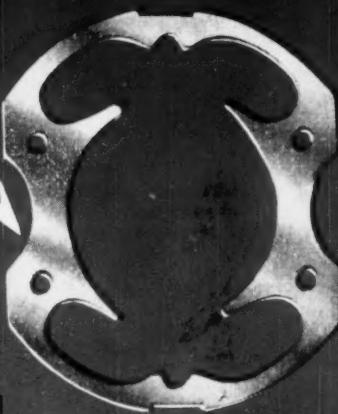
• • •  
"They told me I'd find the big gear in here . . . er . . . ah!"



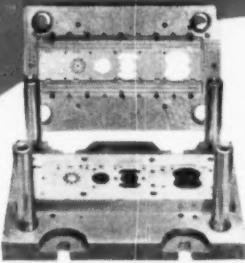
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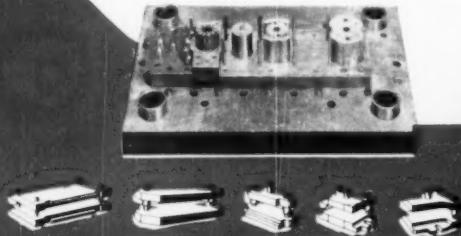


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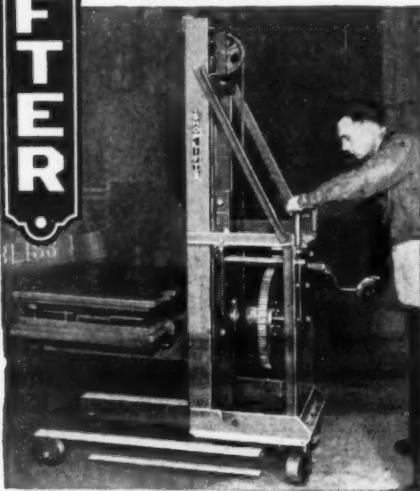
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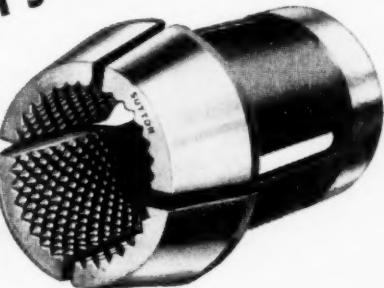
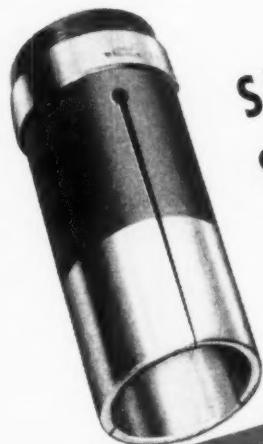
Fig. 4. Impregnated diamond saw for sawing granite.

These specially designed steel blades with big operating wheels are provided with a thin strip of sintered tungsten carbide into which diamonds are embedded. The sawing blade has a speed from 2,000 to 8,000 ft./min. and practically all refractory and hard materials can be cut on this machine, i.e. sintered carbide, hardened steel, glass and all rock materials. The success of this operation was due to the careful design of the sawing blade and a reduced feed pressure.

It has to be observed that only one tooth is operating at a time so that the thinner the workpiece, the smaller the pitch of the sawing blade. With very wide workpieces a relatively larger pitch, figure 3, has to be applied. In stone sawing hitherto only sawing blades with single diamonds set into steel sockets were in use. Recently impregnated diamond sawing blades have been developed for the successful sawing of marble (Norton Co.) and granite (Impregnated Diamond Products Ltd.). Whereas marble can be satisfactorily sawn with the socket type blade, the sawing of granite was considered im-

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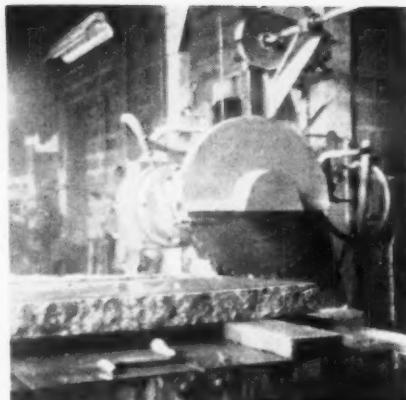


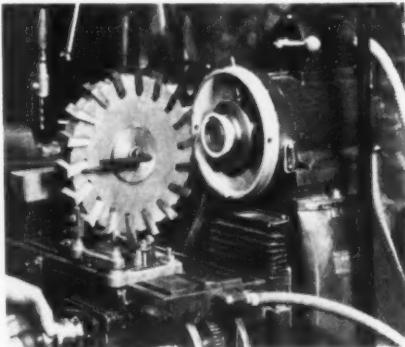
Fig. 5. 30-inch diameter segmented type diamond sawing disc for marble sawing. Norton Co.

possible using single diamonds, and only the impregnated diamond saw, figure 4 a and b, made it possible to saw this material at a higher rate than was possible with silicon carbide grinding wheels. A further development are so-called rubbers for stone polishing. These are metal-bonded diamond sticks of straight or curved shape fixed to a metal disc in starlike arrangement and rotated by a flexible shaft.

**Sintered Carbides:**—

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Fig. 6 Sharpening sintered carbide tipped milling cutter on special carbide grinder.



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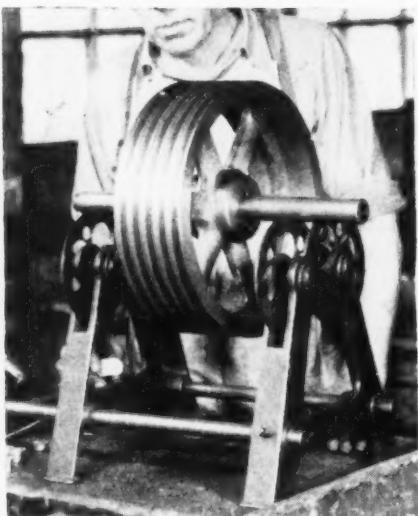
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well as ground and lapped. Nearly all machines for grinding sintered carbide tools are suitable for the use of diamond grinding wheels, if not exclusively designed for this purpose, figure 5.

#### Hardened steel:-

Some jig grinders make use of impregnated diamond grinding wheels or pins for connecting holes in hardened steel. Very revealing is the practice of the Bristol Aeroplane Co. to hone nitrided stainless steel cylinder sleeves on the inside and outside with diamond honing sticks. Special mechanically and hydraulically operated fixtures, figure 6, have been developed for this purpose. With diamond honing sticks of various types (resin bonded, metal bonded, vitrified) surface finished down to 0.75 micro-in. average height have been obtained. Subsequently diamond impregnated honing sticks have been applied for the finish honing of cast-iron cylinders.

THE END.

Through an error, last month's article failed to mention the Citco Hydraulic Diamond Turner which turns the diamond every three degrees. The Turner, made by the Cleveland Industrial Tool Corp., Cleveland, O., was mentioned in greater detail in the March 1950 issue of MACHINE and TOOL BLUE BOOK.

Appointment of **D. M. Berges** as chief engineer has been announced by R. J. Minshall, president of the Pesco Products Division of the Borg-Warner Corporation, Cleveland.

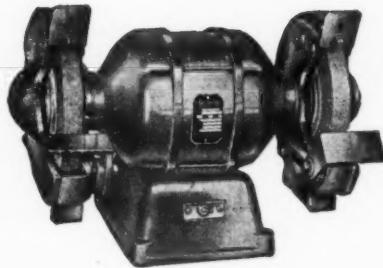
The appointment of **George C. Jelliffe** as eastern district manager for the Ilg Electric Ventilating Co., Chicago, has been announced by P. D. Briggs, vice president and general sales manager; eastern district headquarters are at 15 Park Row, New York City.

Harnischfeger Corporation, Milwaukee manufacturers of arc welders and electrodes, announces the appointment of **Melvin O. Monsler** as sales manager of the P & H Welding Division.

Tomlinson Fort, manager of apparatus sales for the Westinghouse Electric Corp., has announced the appointment of **O. O. Rae** as manager of the firm's Southeastern District, with headquarters in Atlanta.

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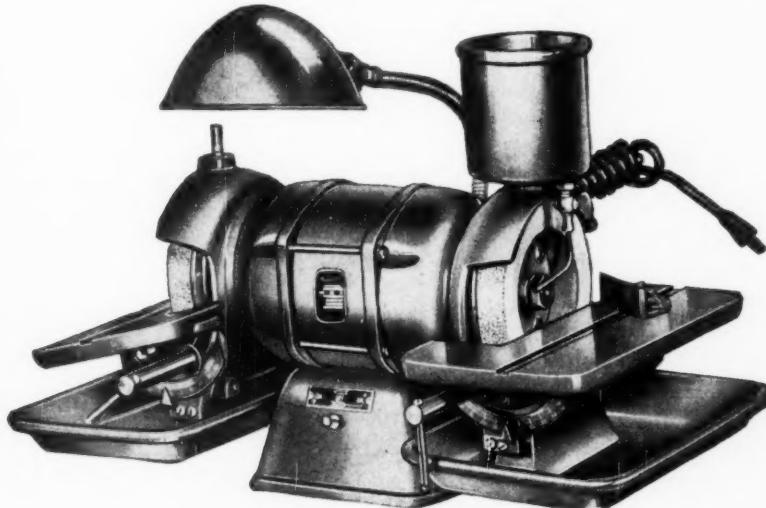
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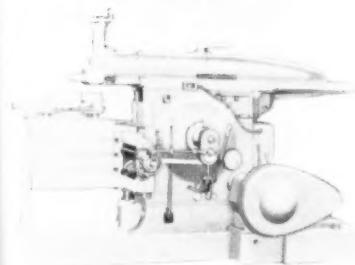


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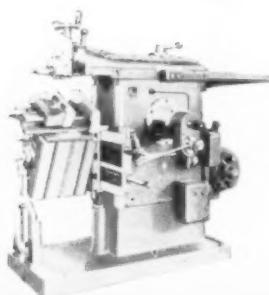
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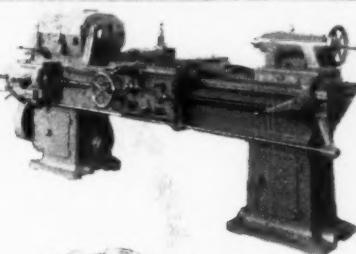
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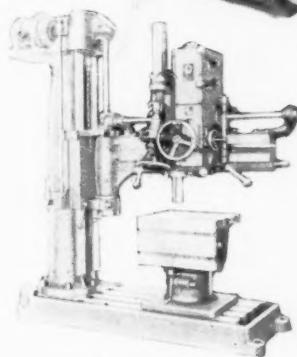
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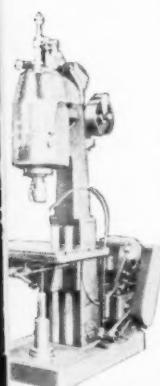
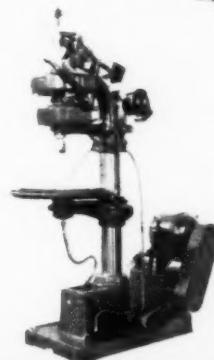
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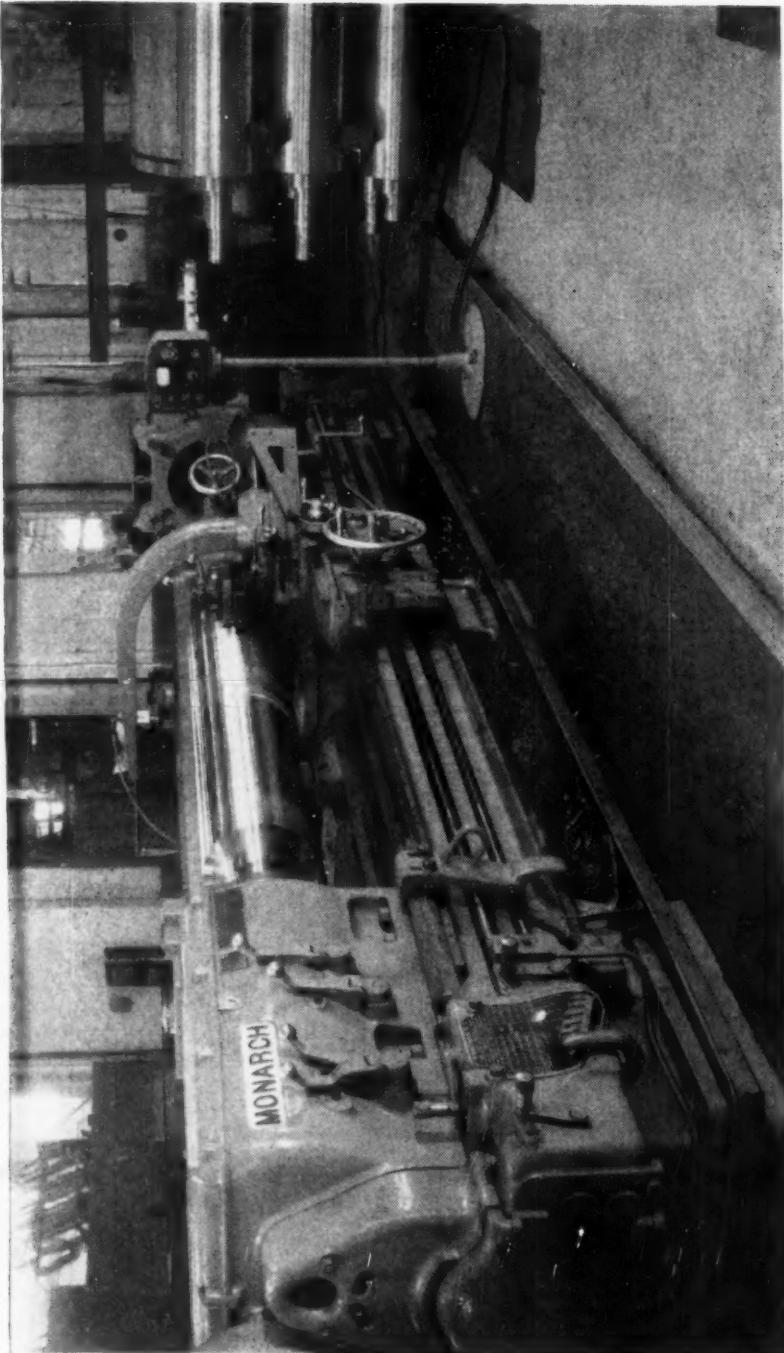
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## JOB FACTS

**Part:** Printing Press Roll

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**Size:**  $107'' \times 14''$  Diam.

**Machine:** Monarch 25 x 144 Model N Engine Lathe equipped with Air-Gage Tracer and Packaged Controls

**Tooling:** Carbide Tipped

**Operations:** Turn Necks and Body complete  
Tolerance:  $\pm .001'' - .000''$  between  
Shoulders

**Former Time:**  $7\frac{1}{2}$  Hours

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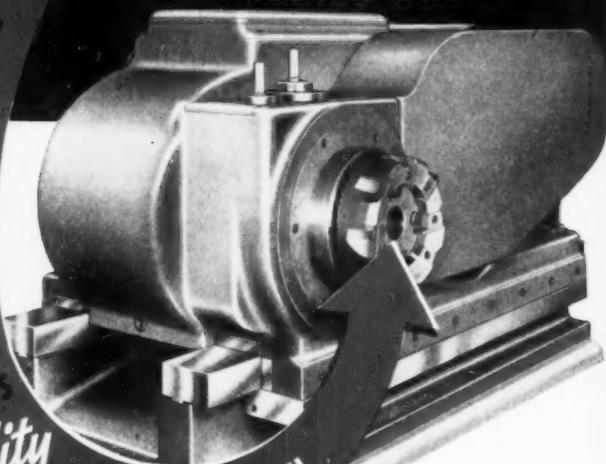
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# Letter from England



Written for the MACHINE and TOOL BLUE BOOK by Robert Hutcheson, Editor of MACHINE SHOP MAGAZINE, London, England.



**Engineers Addressed by New Yorker.** In Birmingham this weekend the local section of the Institution of Production Engineers held their annual dinner and dance and among the chief guests was Professor J. M. Juran, chairman and head of the Department of Administrative Engineering in New York University. Professor Juran has been touring Europe and was spending a week in Britain before returning to the United States. On Monday evening he gave a lecture to a very large number of members of the Institution, the subject of his lecture being "Management Prerogatives and Rights in the Job." He suggested that over a period of centuries just what may become property has undergone a change; land was an early form of property; at a later date stocks and shares became property which could be bought and sold. While new concepts of what may become property arise, so do forms of property vanish, for example, slaves are no longer property in civilised countries. Professor Juran traced the change in concepts of ownership of property and forecasts that at some time a job will become property and be owned by the man who performs it. When this happens, managements and employees will have new sets of problems. Management was likened to the brains of an undertaking and it is necessary for management to maintain a proper balance between all the forces concerned, e.g. the shareholders, the customers and the employees. The main purpose of any industrial undertaking is to render service to the community and not to exploit the community for the purpose

of making large profits. Any firm that does not have as its first motive service to the community is, in the long run, bound to perish.

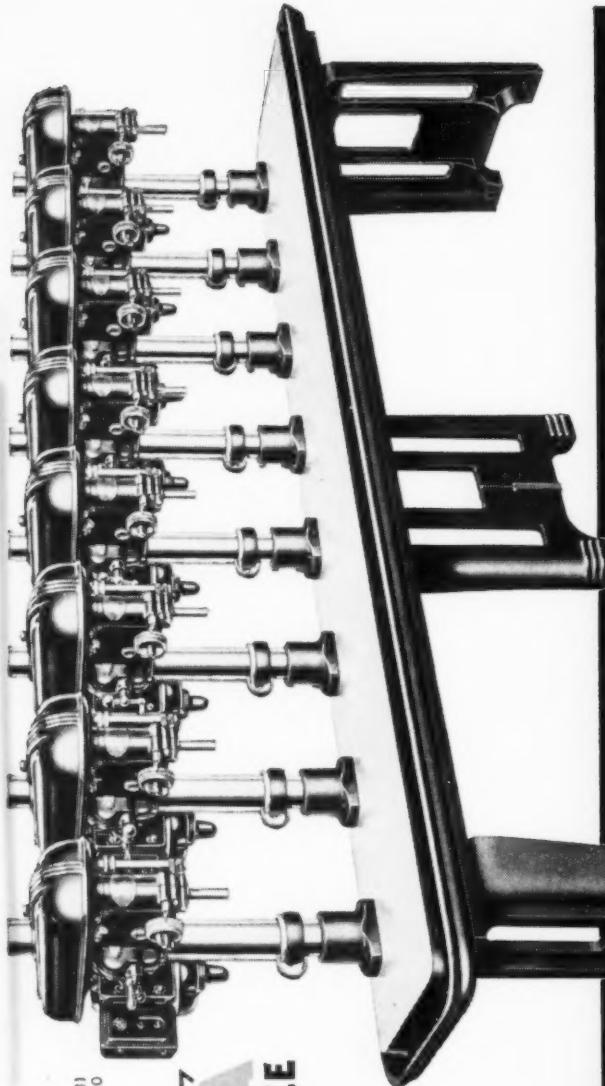
Professor Juran's lecture was purposely provocative and stimulated a very active discussion.

\* \* \* \*

**Branch Factories.** There is a growing tendency for firms that have grown up here in Great Britain to open works in other parts of the British Empire. One of the latest firms doing this is the London Aluminum Company, who will build a factory in Capetown, South Africa, to make equipment for breweries, dairies and chemical plants and to produce aluminum holloware. The chairman and managing director of the Company, Mr. Duncan Campbell, who has just returned from South Africa, has registered the new Company in South Africa and has obtained an option on a factory site. Key men taken from Britain and the British plant, will be sent out to equip the new works. At present in South Africa there is no manufacture of the products that it is intended the new factory will make.

\* \* \* \*

**British aircraft builders** are being hard hit by the Government's decision to limit the purchase of new aircraft. The amount to be spent in research, development and production in respect of civil aircraft is being reduced by  $2\frac{1}{4}$  million pounds; £2,400,000 is being provided for this work instead of £4,636,500 last year. One principal reason for this that is given is that the heavy development charges for the



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giant aircraft, the Brabazon, and the Comet jet plane have been covered by previous estimates.

\* \* \* \* \*  
**Scholarships.** One of the recent activities of the Institution of Production Engineers has been the introduction of the Schofield Travel Scholarships, the name of the Scholarship having been chosen in recognition of the work done for the Institution by the present president, Dr. Herbert Schofield. Two graduates of the Institution, Mr. W. N. Aspinall, who is employed by the English Electric Com-

pany, Ltd., and Mr. B. E. Stokes who is with Joseph Lucas & Company, Ltd., have been awarded the first two scholarships and they are now in America, where they are spending the first few months of their stay with Kearney & Trecker in Milwaukee.

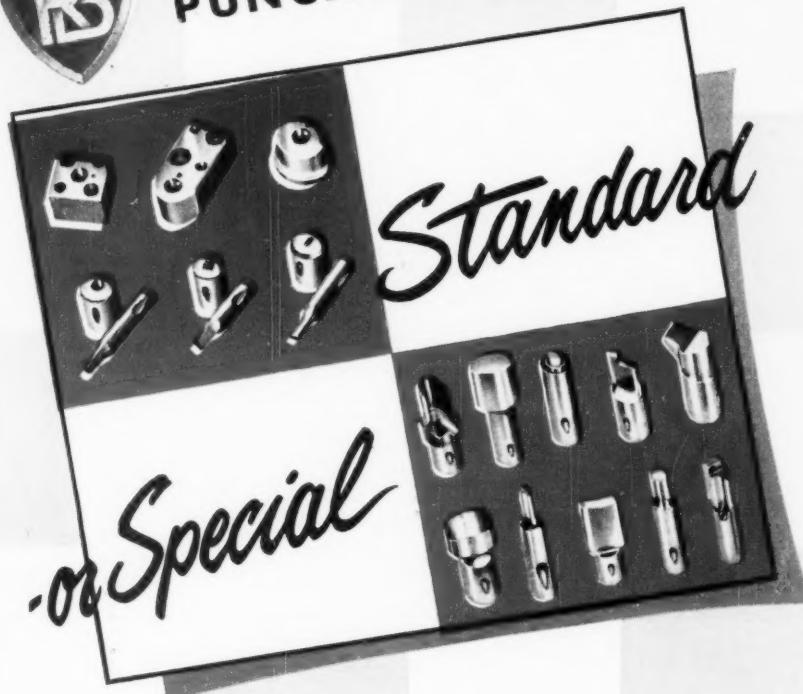
\* \* \*

**Gas Turbine Automobiles.** The most exciting automobile news in this country has been the successful trials of the world's first gas turbine powered car produced by the Rover Motor Co. Ltd., Birmingham. The trials were carried out in the presence of the Royal Automobile Club officials, who issued a certificate saying that the car was driven by a gas turbine and was a genuine product. It is hoped that the car will be granted a registration number so that it can run on the public highway, in which case the fuel will have to be petrol instead of kerosene which is illegal for use as a vehicle fuel in Britain.

The turbine rotor used in the car is a mere 6 ins. or so in diameter and has blades which are integral with the turbine disc. This presents a major machining problem and negotiations are in hand for the design and building of suitable mass production equipment for machining the rotors. Behind the development of the turbine is a 38 year old New Zealand engineer, F. R. Bell, who was associated with Doble Steel Driven Vehicles early in his engineering life. Bell has headed the gas turbine development team at the Rover works for the pas-



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five years and is supremely confident that gas turbines have a future as power units for purposes other than automobiles. He believes that gas turbine power units will offer serious competition to the compression-ignition engine, particularly for marine use. The next step in the development work is to perfect a heat exchanger which will help to reduce fuel consumption; the prototype model was not fitted with a heat exchanger.

**Materials Handling.** In this country interest is building up rapidly in the use of mechanical handling equipment for all industries. Two years ago a very successful exhibition of mechanical handling plant was staged in London and the second, but very much larger event of this kind, is to be held here from the 6th to the 17th of June. British manufacturers of all kinds of materials handling plant from trucks to conveyors, have overhauled their designs during the past few years and the range of plant now offered seems to be the best that can be bought. Running in conjunction with the exhibition is a convention at which sixteen papers will be read on various aspects of mechanical handling. Large numbers of industrialists are applying for admission to these sessions and the exhibition is attracting worldwide attention.

\* \* \*

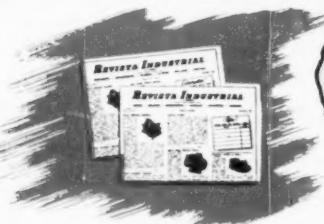
**Trent Oil Products** had on foot a scheme to establish at Tynemouth an oil refinery which was to have cost 3 million pounds. Crude oil was to be taken direct to the Tyne in tankers. However, in view of the national policy to restrict expenditure on capital equipment this scheme has been postponed and it would appear that at least two years will lapse before a move is made again.

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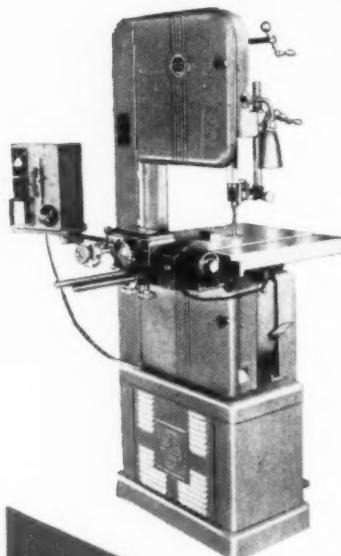
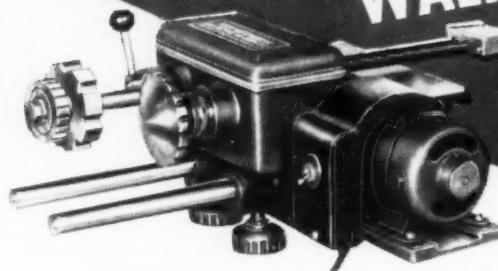
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# A bstracts . . .

## from technical papers delivered at the A.S.T.E. convention

### Ford produces 3,000,000 valve guide bushings per month

How "Automation"—the automatic handling of parts in production without physical effort by the operator—has been applied to the production of 3,000,000 parts a month, all far more alike than two peas, was detailed to members and guests of the American Society of Tool Engineers at Convention Hall, Philadelphia, by N. L. Bean of the Ford Motor Co.

The parts—valve guide bushings for Ford V-8 engines—were selected as "Ginea pigs" by Ford. The object was to work out methods and equipment for reducing physical labor on all kinds of parts required by the tens of thousands a day.

The result is highly interesting. Only once in the entire production line are the bushings touched by hand and even this single manual operation out of dozens performed automatically on 3,000,000 bushings a month may soon be "automatized".

The bushings arrive in bins from the foundry. These bins are carted by a lift truck to the bushing department, raised nine feet in the air and the parts dumped into a hopper shaped like an inverted pyramid. Out of this hopper the castings drop one at a time onto a moving belt which carries them up an incline to a battery of centerless grinders. Here they are dumped into another hopper from which they move in a continuous stream through the first grinder, a second and third, gradually bringing the outside of the bushing to required size.

As they come out of the grinders, the bushings fall onto a moving belt which dumps them onto a wire mesh conveyor carrying them through a washing tunnel. Cleaned of grinding compound and grit, they drop onto another belt taking them to a battery of automatic screw machines, which perform four operations each: turning the small outside diameter, drilling and reaming the bore and facing and chamfering the end.

Each of these machines has its own hopper, with a feed gate. When the hopper is full the gate closes automatically so that the bushings can't drop off the belt but travel to the next machine's hopper and so on.

As a bushing drops out of the bottom of one of these hoppers it is pushed up a twisted vertical chute by a plunger, each part pushing the part ahead of it. When the chute is full, additional bushings just drop back into the hopper through a by-pass. The chute feeds the bushings through the machine spindle into machining position one at a time—where they are automatically clamped and machined. The next bushing kicks the "finished" one onto one of two rubberized (to prevent damage) belts. Half of the bushings go onto one belt, half on another. The first belt takes its bushings to another automatic machine to perform further operations required on the bushings for the exhaust valves.

The exhaust bushings are fed into this machine by first dumping them into a hopper bin near the floor. From this bin an inclined conveyor takes them up to a selecting hopper under the ceiling which



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selects the bushings, turns them right end up and drops them into one of two chutes at the proper rate of speed. These chutes are shaped like a 'horse-collar' and are actually referred to by that term.

Again the bushings are fed into and out of the machine (when finished) by cam operated plungers. They drop onto another conveyor and go to meet the intake valve bushings at the finish-grinders. They are not mixed, however, the intake bushings going through one group of grinders, the exhaust bushings through another.

As they drop out of the grinder they fall into wire baskets designed so that rubber bumpers check their fall and let them drop gently the last few inches.

At this point a manual operation is finally required. It consists of picking up the full baskets and setting them on a conveyor which takes them through another washer. As they come out of this, a monorail conveyor picks up the baskets and transports them to the precision boring machines. Here they are placed in hollow tubes through which they are fed into and out of the machine. Locating of the parts in the machine (with locating plungers—vertical and horizontal) and machining is again automatic.

An interesting thing about these machines is that they do not machine the bores "as smooth as possible". Rather, the surface produced inside the bushing is purposely made

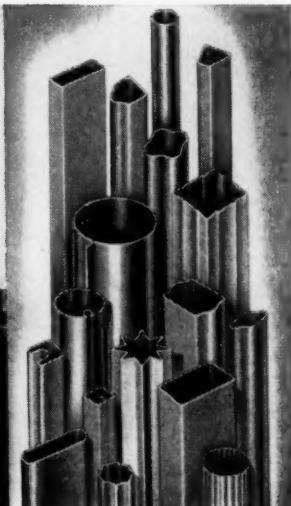
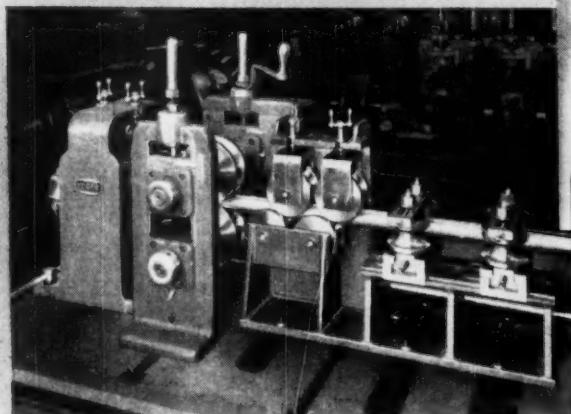
slightly "rough" for better lubrication in service.

The machines are so accurate that no gaging is required. To make doubly sure, however, each bushing is passed over a rotating reamer—by hand. If the reamer tries to turn the bushing slightly in the operator's hand, it is O.K. If the bushing just slides over the reamer without trying to turn with it, it is rejected as "oversize".

This, the only real manual operation in the entire line, may also soon be "auto-

# 12 Examples of Economies Effected

by combining different operations in a Yoder Roll-Forming production line



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Flat stock, in coils or cut lengths, is automatically fed into the machine to

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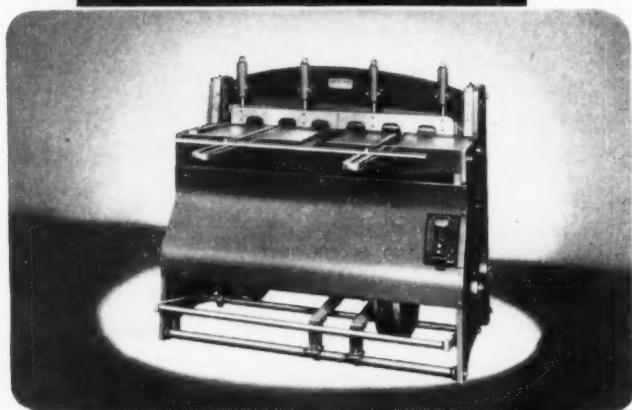
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matized". Ford is working on a device which will measure the "tendency to turn" to an one-eighth-inch. This device will make it possible to automatically OK or reject bushings.

The "inspected" bushings are placed in trays which dip the bushings into various liquids to coat the bushings with phosphate. As they come out of the coating machine, a "shipping" tray is placed over the plating tray and the two are flopped over, dumping the finished bushings gently into the shipping trays. These

trays are stacked six high and are carted by a lift truck to the engine assembly line.

In this manner as many as 127,600 bushings have been produced in two eight-hour shifts—a rate of better than 132 a minute with a scrap of less than four one-hundredths of one per cent. One rejected bushing for every 2,500 which met all requirements.

Obviously a setup such as this depends for its production efficiency on having the machines all operating with a minimum of down-time for tool changes, etc. For this reason carbide tools are used wherever possible since these are able to hold required dimensions over long runs without requiring sharpening or re-setting. For this reason, also, grinding is done in steps—so that wear will be a minimum on the grinding wheels on individual machines. Solid carbide is also used (for rigidity and accuracy) for the

boring bars on the precision machines.

Following are the productive speeds of some of the machines:

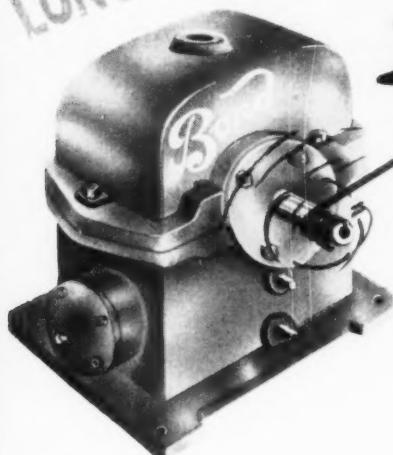
Automatic Screw Machines —	900/hr./Machine
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### Holes can be made cheaper

Cost of producing accurately finished holes in production can be greatly re-

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duced by proper tooling, said Eugene Numrich, application engineer, Avey Drilling Machine Co.

Drilling of holes is so common an operation that the drill is rarely relied upon to produce holes to close tolerances; usually reaming, broaching, grinding or lapping operations follow, depending on the job.

By giving more attention to the grinding of the drill and use of suitable guide bushings to align the drill during the cut, holes can frequently be produced to an accuracy and finish which will eliminate subsequent operations without increasing drilling time in any way.

Numrich described the great variety of drilling equipment which has been developed to make possible lower-cost drilling of holes under all kinds of requirements.

### **Greater use of die casting to lower machining costs**

Greater use of accurately formed die-castings to eliminate machining operations on all kinds of parts was advocated by Charles Franklin, Rochester Products Div., General Motors Corp.

Recent advances in the art of die-casting have made it possible to hold closer tolerances than in the past. Holes can be "cast into" die-cast parts to a size equal to that of drilled and reamed holes when produced by machining, he said. Holes as small as 0.028" in diameter and 5/64 inch deep have been cast successfully in thousands of parts.

Small tapered holes almost 3 inches

deep can also be produced with relative ease. Even lower production costs than formerly are now possible with die-casting. Most die-casting machines are now completely automatic in operation. This has been accomplished in part by making the dies in the machine operate practically like "machines" with such moving parts as side slides, core pins, ejector pins, ejector slides, re-entry slides for ejection, cam followers, etc. An interesting development directed at lowering die cost for such machines is in the form of experiments now being carried on with dies made of alloy cast iron.

### **Broaching cuts production time and costs**

Vast reductions in manufacturing time and cost are being achieved on all kinds of products through the use of "broaching", according to O. W. Bonnafé, chief research engineer, LaPointe Machine Tool Co. Rifling of gun barrels, for instance, had been cut from over  $\frac{1}{2}$  hour per barrel to only 28 seconds. In producing T-shaped holes in forgings, requiring the removal of 75 lbs. of metal in the form of chips, time was cut from 65 man hours to only 20 minutes.

Again on a large internal clutch, installation of broaching equipment paid for itself in time saved on the first few dozen parts produced.

A radio manufacturer cut the time required to produce certain stamping dies from one month to only 30 seconds. In

---

### **ARE YOU A GOOD INSPECTOR?**

by Herman Reichardt, Consulting Engineer

Count ten points for each question answered correctly. 90 to 100 is excellent and nothing will slip by; 80 to 90 is very good; 70 to 80 is good; below 70 . . . there'll be a lot of rejects!

1. A dial indicator is interpreted by reading a \_\_\_\_\_ dial.
2. A drift is a small slot in the side of the taper lock gage handle near the \_\_\_\_\_ end.
3. An adjustable length gage consists of a length gage \_\_\_\_\_ and length gage head.
4. A spline gage is a \_\_\_\_\_ gage having a series of projecting keys.
5. A plain \_\_\_\_\_ gage of circular form measures outside dimensions.
6. The shank fixes the gaging member to the \_\_\_\_\_.
7. The hub determines the \_\_\_\_\_ of the gaging section.
8. A master disc is used for \_\_\_\_\_ comparators snap gages, etc.
9. A \_\_\_\_\_ plug gage determines size of conical holes.
10. The flange is the external portion of the \_\_\_\_\_ gage reduced in size to lighten the gage.

**Answers to Quiz on Page 269.**



SUNSET

over the  
ROCKIES?

No, it's the magnified "horizon" of a series of Nicholson file teeth as viewed through an *optical comparator* (a "seeing eye" instrument that profiles objects and enlarges many of them up to 125 times). Note that the teeth are all uniformly high, uniformly spaced—ready to share the work evenly. The added check-ups afforded by this scientific watchdog help greatly in keeping the file-cutting machines in perfect adjustment—thus preventing the uneven spacing that usually results in high and low teeth like this.... →

And what good are low file teeth if they can't reach the work? None at all. What's more, shirking their duty puts an extra strain and wear on the reduced number of high teeth. The results in poor file work, shortened file life and excessive file costs are obvious.

Uniform cut—as precise as human skill and well-designed, efficiently maintained file-cutting machinery can achieve—is one of many features of Nicholson files that spell **QUALITY** in the highest sense. They have enabled the world's foremost file manufacturer to guarantee *Twelve perfect files in every dozen*.

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NICHOLSON FILE CO., 16 Acorn St., Providence 1, R. I.

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# NICHOLSON®

A FILE FOR EVERY PURPOSE

producing connecting rods a single broaching machine replaced 7 milling machines and gave greater production, he said. In another case the number of machines eliminated by broaching equipment for producing textile mill rolls amounted to a 95% reduction in floor space required. The broaching machine, in addition, turned out more accurate rolls with a better finish.

Quick replaceable and adjustable broach sections and use of tungsten carbide in finishing sections were among the items cited by Mr. Bonnaffon as contributing to further raising productivity per hour and day of broaching machines.

## PUNCHES and DIES



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All Makes of  
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A large range of round, flat, square, and oval sizes is carried in New York stock.

Special Tools and Odd Sizes Made to Order

Circulars covering our line of metal working tools available.

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✓ **Specify**  
**TOPFLIGHT TAPE**

For quickly applied labeling, parts numbering, coding, instructions and warning notices, name plates. Pressure-sensitive tape, printed to your order.

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## Automatic presses produce and assemble parts without being touched

Striking cost-cutting possibilities of using automatic machines to assemble parts instead of using manual labor were outlined by Herman Zorn, president, V & O Press Co.

Zorn described how various parts can be first automatically formed in presses and then assembled with other parts fed into the machines by transfer devices, hoppers or the like. In this way certain sub-assemblies of manufactured products can be turned out completely automatical.

The raw material—such as strip steel—can be fed automatically into one side of the press and the assembled unit comes out of the other side, as many as twelve or fifteen operations having been performed in between.

In some cases the movement of an operator's hand is duplicated by a "mechanical hand" which has either fingers or a vacuum cup to pick the part, move it into place in the machine and release it there. Such hands do not necessarily eliminate the operator but make his job easier and far safer since it keeps his own hands away from the machine.

Some of the presses to which Zorn referred can perform as many as 1000 operations in a single minute.

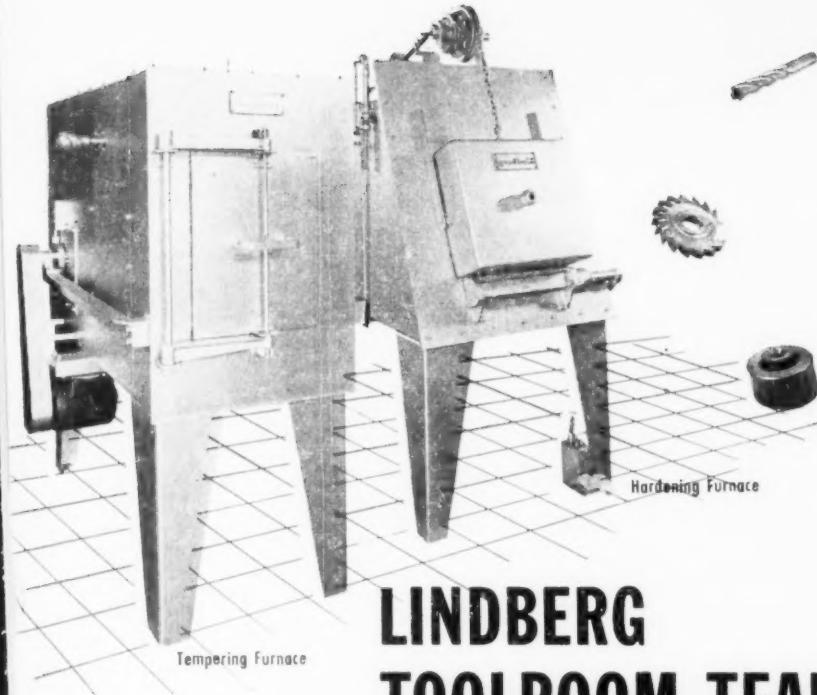
## Ultra-hard new die metal cutting costs of metal products

Ultra-hard cemented tungsten carbide offers industry an excellent means not only of reducing the cost of all kinds of formed, punched or drawn metal stampings but also to improve the quality of such products, according to George Eglinton, vice-president, Lincoln Park Industries, Inc.

Eglinton said that dies made of this material cost only 2 to 4 times as much as steel dies but last 10 to 50 times as long and produce better products while they are being used.

In addition to the reduced die cost, the freedom from service trouble means higher production from stamping presses with less down time for maintenance.

Users of such dies were warned, however, to watch their press equipment. Since the carbide die continues to burn out high quality stampings long after the press would have had to be shut down with a steel die, there is a tendency to forget that press mechanisms require attention.



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*...for the finest tools and dies!*

For the precise hardening and tempering of expensive tools and dies—specify Lindberg Hardening and Tempering Furnaces.

**FOR HARDENING**—eliminate finishing due to scale and decarb with simple accurate atmosphere control.

**FOR TEMPERING**—obtain the exact "Rockwell Hardness" needed for the ultimate performance from your tools and dies.

Write for your copy of  
"How To Plan Your Toolroom  
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## *It's the CUT that COUNTS*

and Capewell HACK SAW BLADES  
offer 2 Exclusive Advantages

**Ask Your Distributor  
about . . .**

Capewell hack saw blades and frames, band saws (in coils or welded), Dafiles, ground flat stock, compass and keyhole saws and hammers.

- 1 A bonus of 10% additional cutting—because Capewell's exclusive "Statistical Quality Control" raises standards and eliminates sub-standard blades.
- 2 Instructions printed right on the hand hack saw blades indicating correct use.



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HARTFORD 2, CONN.

### *New development cuts costs in tooling up new aircraft*

R. B. Schultz, general supervisor of manufacturing research, Glenn L. Martin Co., revealed details of a new development in making dies which is claimed to cut die cost just about in half.

The process is said to combine the high production capacity and accurate forming ability of conventional steel dies with the low cost of easily and quickly fabricated dies made of rubber.

Use of rubber in die construction first

came in a number of years ago to provide quick low cost tooling for short runs. The process did not lend itself as well to the higher production levels now reached at times in the aircraft industry. It also did not work out too well when the metal had to be 'stretched' in forming it, as so often is required.

The new half-steel half-rubber die construction is said to overcome these difficulties. Time required to set up machines for use of these dies is claimed to be negligible. In many cases the new dies are said to be providing better ability to "stretch" metals to desired shape than steel dies. The rubber apparently provides a cushion which enables metal to be drawn some 50% deeper than with steel dies.

An important advantage of this development is that it may eliminate multiple operations in forming of metal parts.

From a safety standpoint the dies are also claimed to enable drawing of metals to more uniform thickness. The dies have already been used for a number of different materials including sheet steel up to 1/10th inch thick, and aluminum up to  $\frac{5}{8}$  inches thick.

An interesting finding also was that the sheet metal could frequently be coated with finishes such as vinyl plastics and some paints before drawing without injuring the finish.

### *Cold roll forming of metal parts to cut costs*

Lower production costs for such things

# PRECISION FINISH



GROUND SURFACE  
15 X MAGNIFICATION



MACHINED SURFACE  
15 X MAGNIFICATION

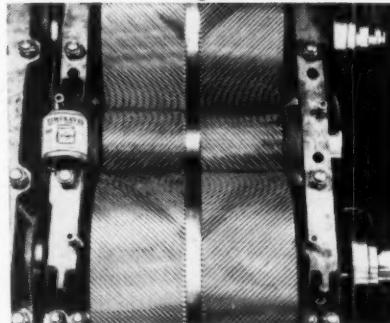


TIMESAVER  
LAPPED SURFACE  
15 X MAGNIFICATION

**PLUS**  
**PRECISION FITS**



WITHOUT  
SPECIAL  
TOOLS



BY THE  
AVERAGE  
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## **With TIMESAVER LAPPING COMPOUND**

Safe on any fitting job  
Gears — Bearings — Slides — Cylinders — etc.  
WILL NOT CHARGE THE METAL OR CONTINUE TO CUT  
On the Market for 30 Years  
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**546 WEST WASHINGTON BLVD.**      **CHICAGO 6, ILLINOIS**

# NIAGARA ANNOUNCES a complete new line of **SOLID ONE-PIECE** **Steel Frame** **Presses**

**Straight Side, Double Crank**

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**Presses, Shears,**  
**Machines and Tools**  
**for Plate and Sheet**  
**Metal Work.**

Made in sizes up to the maximum that can be shipped on a freight car. (Larger sizes are four-piece tie rod construction).

Furnished with Niagara Air Actuated, Electrically Controlled Sleeve Clutch on sizes up to 6½" shaft. Plain or single geared, single end drive.

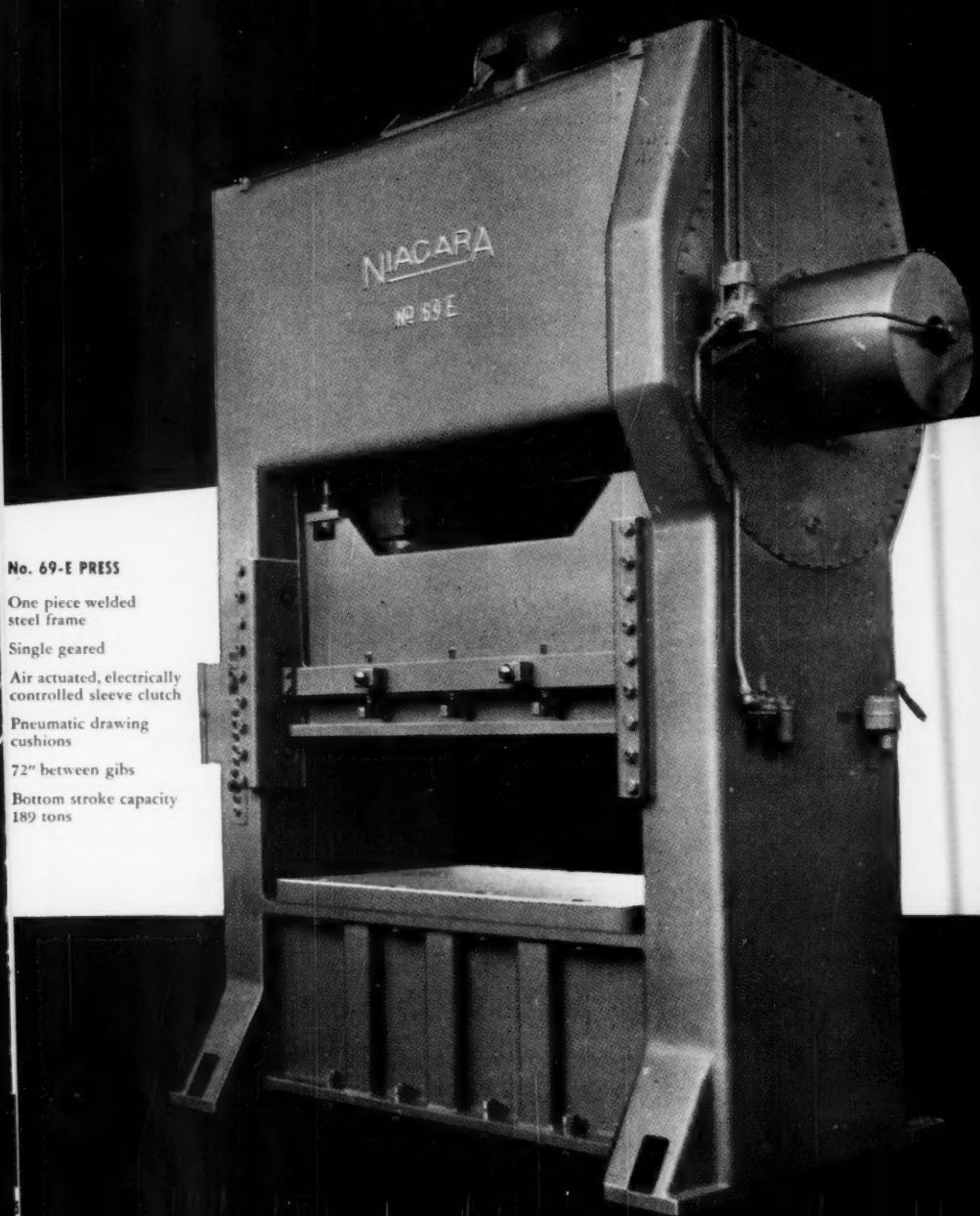
Furnished with Niagara Pneumatic Friction Clutch on sizes 4½" to 12" shaft. Single geared or double geared, single, end or twin drive.

Made in lengths up to 96" between gibs. (Longer lengths are tie rod frame construction).

Niagara Pneumatic drawing cushions available.

Write for specifications on sizes to fit your requirements.

**NIAGARA MACHINE AND TOOL WORKS,**



**No. 69-E PRESS**

One piece welded  
steel frame

Single geared

Air actuated, electrically  
controlled sleeve clutch

Pneumatic drawing  
cushions

72" between gibs

Bottom stroke capacity  
189 tons

**BUFFALO 11, NEW YORK**

District Offices: Detroit, Cleveland, New York

as metal trim, mouldings, building parts, corrugated materials, etc., for automobiles, appliances, housing and so on, are now possible by cold rolling these parts to shape from strip and sheet metal, according to E. J. Vanderploeg, development engineer, The Yoder Co.

In producing formed angle stock one small punch press and one small roll-forming machine will with a single operator produce more parts than 3 power presses with 3 operators.

The process can be applied to materials up to  $\frac{1}{2}$ " thick at present, to pipe up to 20" in diameter and to steel plate up to  $\frac{3}{4}$ " thick and practically 8 ft. wide.

It is even possible to finish the material before rolling it to shape, thereby further reducing costs. Among suitable finishes he mentioned galvanizing, plating, polishing and burnishing plus some organic finishes. Paints won't work so far, however, and parts to be painted would have to be formed first.

The machines which have been developed to do this work are capable of turning out parts at a rate of 30,000 feet of parts per day, automatically cut off to length as they come out of the machine.

#### UNNECESSARY MOTIONS CONTRIBUTE TO HIGH PRODUCTION COSTS

To obtain minimum production costs, tool engineers should pre-determine the time required for every movement required both by machines and by operators, say N. M. Perris and H. K. Keever, partners of Stevenson, Jordan & Harrison, Inc.

The speakers cited numerous examples where a slight change in the fixtures, clamps or other devices on a machine would cut the operator's time sufficiently to increase output per machine hour by 50 to 100%. Much of the unnecessary time consumption is in the devices used for loading and clamping parts in a machine. Similarly a slight change in one operation may greatly reduce the operator's time in another operation. In one case, for instance, just putting a slightly deeper marking nick in a part greatly reduced time in final assembly by making it easier for the operator to align the parts correctly.

In many cases greater economies can be effected by figuring out how to make the job easier for the operator than how to make the machine work faster.



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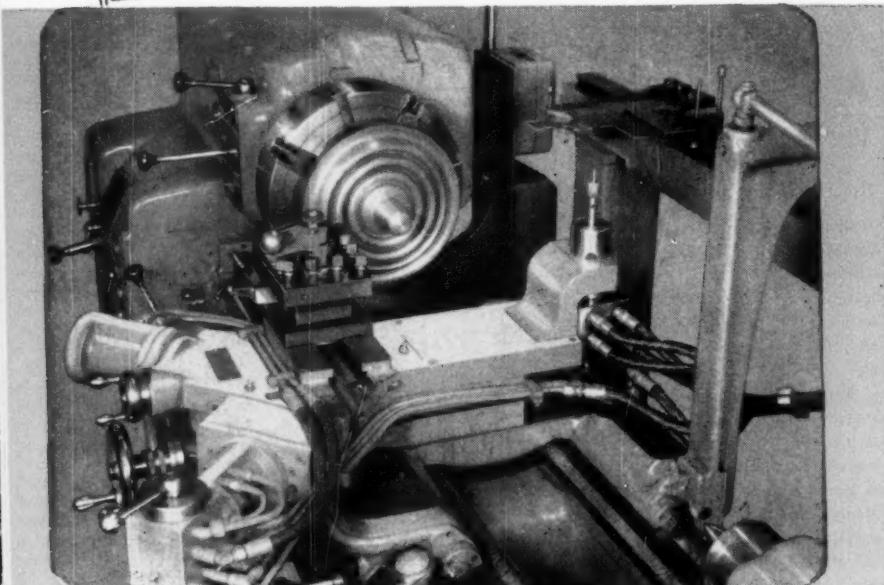
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## Dual turning follower simplifies tricky jobs – saves up to 100% on production costs

Turchan Dual Turning Followers give a new combination of tool movements to your standard lathes. The cross slide equipped with 2 compounds mounted at 45° to center line and 10° to each other, replaces the conventional slide. The 45° movements are actuated by the tracer, while mechanical movements, at right angles, are obtained through the conventional lead screws. Parts with contours on left or right sides of center on diameter, on face, or both, can be readily duplicated. Photo shows

face turning of an intricate die block. Tracer guides cutting tool through difficult "blind spots" with amazing speed and accuracy; finishing operation eliminated.

Turchan Dual Turning Followers can be attached to any standard lathes, converting to fast semi-automatic operation. Other Turchan Followers available for milling machines, planers, shapers and grinders. "Turn to Turchan" to cut costs!

*Send us a print or sample with specifications of job, for a Turchan production estimate.*

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# RUTHMAN GUSHER COOLANT PUMPS

## A Modern Pump for Modern Machine Tools

A trail-blazer in the development of machine-tool coolant pumps, Ruthman is constantly alert for improvements and refinements in design that will give you a more efficient coolant pump. Ruthman Gusher pumps have proved themselves smoother working, longer lasting, more satisfactory in every way. Compare these advantages of Ruthman Gusher Coolant Pumps:

- Improved enclosed motor, end-bells, with larger built-in conduit box.
- Heavy duty, pre-lubricated, precision ball bearings. Dynamically balanced rotary parts for long life. No friction seals or packings for design simplicity. Split-second coolant flow at the snap of your switch.
- Always primed—gravity insures immediate pump action.



FOLLOW THE LEADERS  
USE  
"GUSHER"  
COOLANT PUMPS

**THE RUTHMAN MACHINERY CO.**  
1816 Reading Road  
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### New process may cut steel costs

Squeezing solid blocks of hard steel into many different hollow shapes—just like forming a toothpaste tube from a piece of soft lead—is a new accomplishment of industry which may cut manufacturing costs and save large amounts of valuable metals in the event of another war, said J. P. Bowden of Heintz Mfg. Co.

The idea of "cold forming" steel originated in Germany during the war. Work-

ing with Government ordnance officers, the company has successfully produced many war material items including 20 mm and 75 mm shell bodies, rocket motor bodies, booster castings and 105 mm howitzer cartridge cases.

The new process is said to improve the quality of the finished product, frequently eliminating need for expensive alloy steels and critical brass and bronze. It replaces forging and casting and reduces machining operations required. Enormous savings in scrap are also possible. On 75 mm shells, millions of which were turned out during World Wars I and II, for example, Bowden said, "For each 1,000 tons of (steel) billets, 960 tons of shells should be producible, that is, 40 tons of loss instead of 525 tons by conventional methods—a reduction in metal loss of more than 90 per cent."

On 105 mm cartridge cases, he said, "... two cases may be made out of the same

quantity of steel as formerly required for one—and the steel itself may be of a lower cost type."

Secret of the process is discovery of a method of lubricating the steel during the cold forming process. Some steels, he pointed out, could be reduced to less than one-sixth their original cross-sectional area while pushing them through dies. They also became almost three times stronger in the process and finish is better than by machining, he added. In some of the Heintz Company experimental work, forces up to 325 tons were required to form the blocks of steel.

# Which OF THESE TOOLS WOULD YOU RATHER USE?



This where you have to manipulate the motor with the tool.

or This where you have only the tool to handle.

It's obvious that flexible shaft driven tools like the concrete surfacer at the right, where you don't have to handle the weight of the motor, are easier to manipulate and much less tiring — which means better work and more of it with such tools. With S.S. White flexible shafts you can give any portable tool this big advantage. Remember this when you design portable tools — and remember too, S.S. White will be glad to help you work out the shaft application.



FOR BASIC INFORMATION AND ENGINEERING DATA ABOUT FLEXIBLE SHAFTS  
WRITE FOR BULLETIN 4501.



**S.S. WHITE INDUSTRIAL** DIVISION  
THE S. S. WHITE DENTAL MFG. CO. DEPT. H, 10 EAST 40th ST., NEW YORK 16, N. Y.

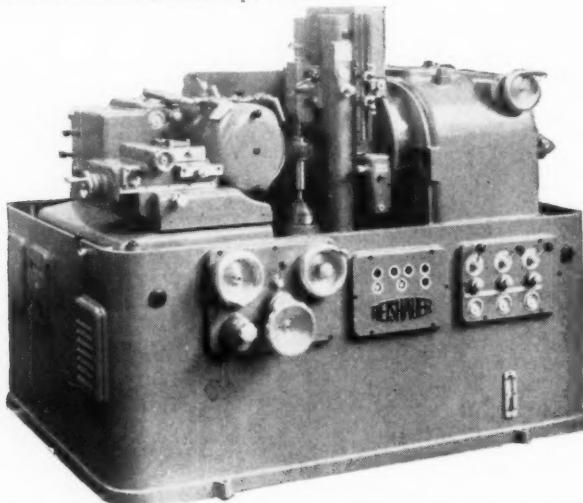


FLEXIBLE SHAFTS AND ACCESSORIES  
MOLDED PLASTICS PRODUCTS—MOLDED RESISTORS

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# Time Is Your Servant

Manufacturing costs have been increasing steadily year after year. The only way to reduce costs—without sacrificing quality and accuracy—is to cut production time. Then time becomes your servant instead of your master. In the production of precision gears, the Reishauer Type ZA Tooth Flank Gear Grinding Machine provides the perfect solution to this constant problem.



The ZA Grinder, operating on the generating principle, produces accurately ground gears on a production basis. The grinding time is appreciably faster than that possible by any other method, thus substantially reducing costs. For example, a 25-tooth gear, with a pitch of DP 8, and a  $\frac{3}{4}$ " tooth width, can be ground from a blank in 4 minutes.

If you grind gears on a production basis; if precision plus high-speed production are important to you—then the Reishauer Type ZA Tooth Flank Gear Grinding Machine will be the ideal machine for you.

This ZA GRINDER and Reishauer's LEAD SCREW LATHES and THREAD CHASER GRINDERS are fully described in illustrated bulletins.

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# THREAD ROLLING

## THREAD ROLLING—PRINCIPLES AND PRACTICE

THE BASIC difference between threads which have been rolled and threads cut by other methods lies in this: rolling forms a screw thread by the displacement of metal, as opposed to the removal or cutting of metal. Thus, thread rolling is really a cold-forging process. During the process of rolling a plastic deformation of the material takes place; the structure of the material is distorted. This distortion has

an important bearing on the strength of the threaded part.

Through this cold-forging process the grain flow of the blanks is refined. Figure 1 shows the cross section of a cut or ground thread in which the fibers (grain flow of the metal) of the blank remain straight and parallel to the axis during cutting and are severed as the thread is produced, leaving exposed shear planes.

---

This is the first of a series of special reports discussing a particular type of machine tool. Included in this month's report on Thread Rolling is:

1. A survey article.
2. Table of blank diameters for thread rolling.
3. List of American manufacturers of Thread Rolling Machines.
4. Types, models and specifications of machines.

5. Text and photos describing some machines in detail.

This survey, and others to come, represents conscientious research and work by the BLUE BOOK's editorial staff aided by the cooperation of manufacturers. It is to be hoped that management executives, engineers, and production men will be aided in locating the specific machine tools which will solve their particular problem.

W. F. Schleicher, Editor

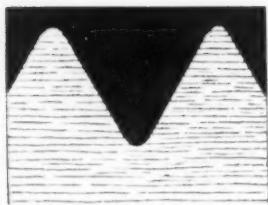


Fig. 1. Cross section of a cut or ground thread showing the straight grain flow. The flow lines of the metal remain parallel to the axis during cutting or grinding.

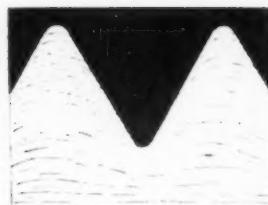


Fig. 2 Cross section of a rolled thread showing the refinement which has taken place in the grain flow of the blank during the rolling process.

Figure 2 shows the cross section of a rolled thread. Notice how the fibres are elongated by the cold working action and rearranged in unbroken flow lines, following the contour lines of the threads.

#### Types of Dies Used

**Two-die Cylindrical-die Rolling:** In this method two cylindrical dies are used in a rotating-type machine. The dies are mounted horizontally on lat-

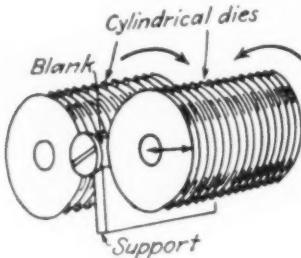


Fig. 3 Two die cylindrical-die rolling.

erally-sliding shafts. These shafts are adjustable to accommodate the various diameters of work. The dies are synchronized to rotate together. Between the die is located a work rest on which the unlubricated blanks are placed. The dies approach, dwell, and release the threaded blank, figure 3.

**Three-die Cylindrical-die Rolling:** Three cylindrical dies are used in a rotating-type machine, all three dies rotate at the same time at a predetermined speed on parallel shafts. The dies are actuated by cams to approach and withdraw alternately. The distance between the dies at the high point of the feed cam controls the diameter of the finished screw, figure 4.

**Flat-die Rolling:** Two flat-faced dies are used in the reciprocating-type machine. One is clamped in the frame of the machine, the other is mounted on a ram facing it and reciprocating past it. The principle of flat die rolling is like rolling a pencil between the palms of your hands where one hand

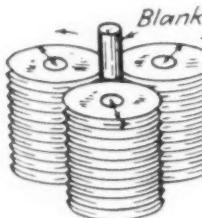
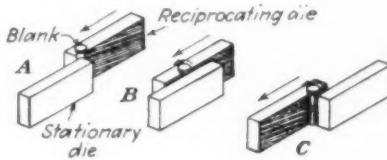
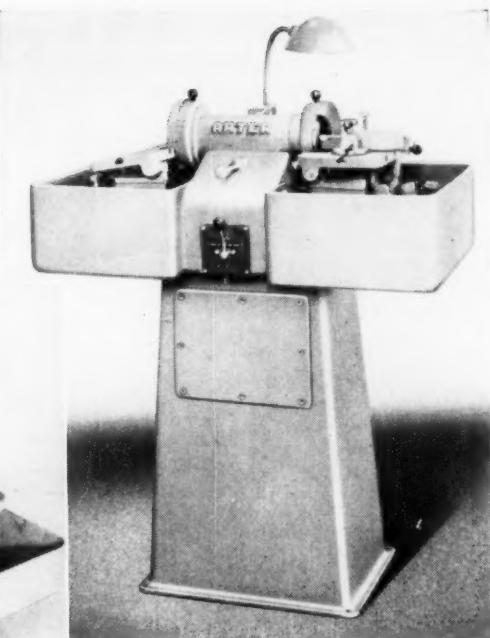


Fig. 4. Three die cylindrical-die rolling.

Fig. 5 Flat-die rolling. The illustration shows the beginning of the rolling cycle, partial completion of the cycle, and the completion of the stroke.



# ARTER IMPERIA Carbide Tool Grinder



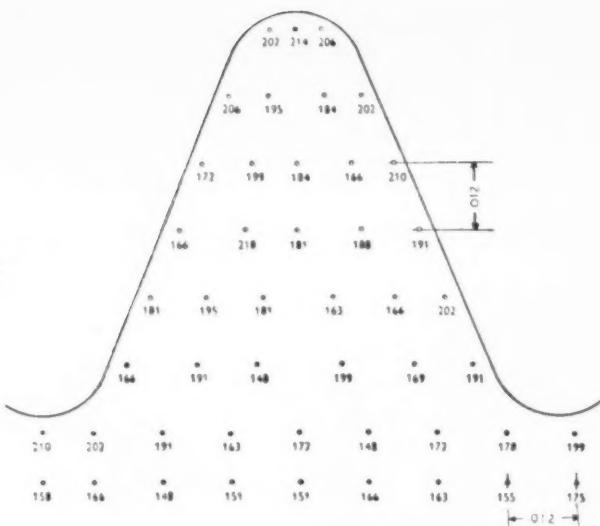
Off-hand grinding of tools is seldom a satisfactory operation. Hands are unsteady, tool shanks can be rough or not flat, work tables may not be smooth. The result—poor tool grinding, shorter life between grinds, possible damage to expensive diamond wheels.

ARTER IMPERIA CARBIDE TOOL GRINDER work tables are *movable*. Tables are held on two pivot-edged side plates by vertical tension springs, forming a flexing mounting. Very light hand pressure moves table and tool forward and back across the face of the diamond wheel. When grinding chip

breakers the wheelhead also can be moved up and down, a compression spring giving smooth easy action. This compact double-table machine can be set up for roughing and finishing tools, finishing and polishing, or finishing and grinding chip breakers.

**ARTER GRINDING MACHINE CO.  
WORCESTER, MASS. . . U.S.A.**

Fig. 6 Vickers micro-hardness of a rolled thread.



is stationary and the other moves the pencil along.

The distance between the faces of the dies at the finish of each stroke determines the diameter of the finished screw, figure 5. The following chart may be used as a guide to proper machine selection.

#### Advantages and Limitations of Rolled Threads

Any of the materials ordinarily used for the production of screw threads may be utilized for rolling, including any of the SAE steel between the limits of 121 Brinell (Rockwell B 68) and 341

Brinell (Rockwell C 35), brass, bronze, nickel, monel, Everdur, aluminum, silver, stainless steel, carbon, or alloy tool steel, high speed steel, etc. Although ductile materials are preferred thread rolling does a satisfactory job on hard or free cutting materials when other operations or end uses dictate the choice of these materials.

Screws, bolts, and studs may be manufactured in all of the many thread forms, including: National coarse, fine, extra-fine; Whitworth; British Association; metric; gimlet-point screws; drive screws; Acme; pipe threads; Dardalet; worm; buttress (provided the flank has

PERCENT INCREASE IN STRENGTH OF ROLLED THREADS OVER CUT THREADS.			
	Low Carbon	Medium Carbon	Alloy
<b>Ultimate Strength Coarse Thread</b>	<b>9.9%</b>	<b>19.8%</b>	<b>14.0%</b>
<b>Ultimate Strength Fine Thread</b>	<b>5.4%</b>	<b>3.4%</b>	<b>9.8%</b>
<b>Fatigue Limit # Fine Thread</b>		<b>52% &amp; 67%</b>	

# ...it's job tested!



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Job tested—in tool and die shops; in grinding, polishing, filing and similar operations. Factory experiences prove that Haskins flexible shaft equipment can step up production, cut costs, in a hurry. For this equipment has all the power and dependable, constant speed needed to turn out more work, better work—faster and easier, with longer trouble-free operation.

Profit-making advantages like these really pay off. Let a Haskins Engineer help you select the Haskins equipment that will do the job *better* in your plant. Consult your classified phone book for the Haskins Engineer nearest you or write to: R. G. Haskins Co., 2645 W. Harrison St., Chicago 12, Ill.



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FLEXIBLE SHAFT EQUIPMENT

## A Guide to Proper Machine Selection for Various Classes of Work.

### CLASS OF WORK

### RECOMMENDED MACHINE

Commercial screws and bolts .....	Flat-die type
Small-diameter threads .....	Flat-die type
Gimlet-point screws .....	Flat-die type
Precision threads .....	Flat-die type, cylindrical two-die type, cylindrical three-die type
Knurling .....	Flat-die type, cylindrical two-die type, cylindrical three-die type
Semihard work .....	Flat-die type, cylindrical two-die type, cylindrical three-die type
Tapered threads .....	Flat-die type, cylindrical two-die type, cylindrical three-die type
Long threads .....	Flat-die type, cylindrical two-die type, cylindrical three-die type
Short threads .....	Cylindrical three-die type
Hollow parts .....	Cylindrical two-die type, cylindrical three-die type
Large diameters .....	Cylindrical two-die type, cylindrical three-die type
Short runs and great variety .....	Cylindrical two-die type, cylindrical three-die type

at least 5 per cent taper).

By using the proper dies the entire thread can be produced as a single or as a multiple thread with either a right-hand or a left-hand helix. Screws requiring a few undersize pilot or lead threads can be commercially produced in a single pass if suitable dies are used in conjunction with properly formed blanks.

Some of the advantages of thread rolling are:

**Uniformity:** Dies customarily produce their original shapes until the entire die has worn, for this reason rolled threads are all uniform if the blanks are held to proper size. A 100 per cent inspection process is rarely indicated on rolled threads.

**Accuracy:** Such precision threads as are used for micrometers, taps, etc. are constantly being produced to close tolerances. Machines are daily turning out class 3, 4, and 5 fit threads.

**Material Economy:** The blanks which are to be rolled are sized to approximately the pitch diameter of the finished thread, hence an economy results when compared to thread cutting or grinding. The accompanying chart shows the material savings which result from using thread rolling:

Screw Size	Saving in %
8-32	23½
1¼-20	24½
1¼-28	17½
1½-13	19
1½-20	13½

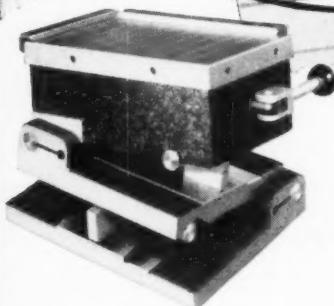
**Production:** The production rate depends on the type of machine, diameter of the blank, material and other factors. Thread rolled on reciprocating machines (utilizing flat dies) can be produced at an approximate rate of 175 on the smaller machines to 30 pieces on larger machines. This production is per piece per minute.

**Thread Strength:** Because of the cold forging action of the thread rolling process threads have improved tensile, shear and fatigue properties. Tensile strength is increased as much as 10 per cent, while fatigue strength is increased as much as 50 to 100 per cent, figure 6.

There are certain limitations to the thread rolling process:

1. It is limited to external threads.
2. Blank diameters must be held as close or closer than the tolerances of the finished product.
3. Rolling is essentially a high production process and is not economical for short runs.

The **MAGNA-SINE**  
cuts tool room costs HERE up to 90%



For grinding and other operations where the work must be held at a compound angle, the Magna-Sine saves money and increases accuracy. Jobs that take an hour or more to set up by other methods can be set up securely in a few minutes with a Magna-Sine.

- For single and compound angle set-ups.
- For grinding, boring, inspection and other operations.
- Set up with standard gauge blocks... positive accuracy.
- Permanent-magnet chuck holds work securely without distortion.

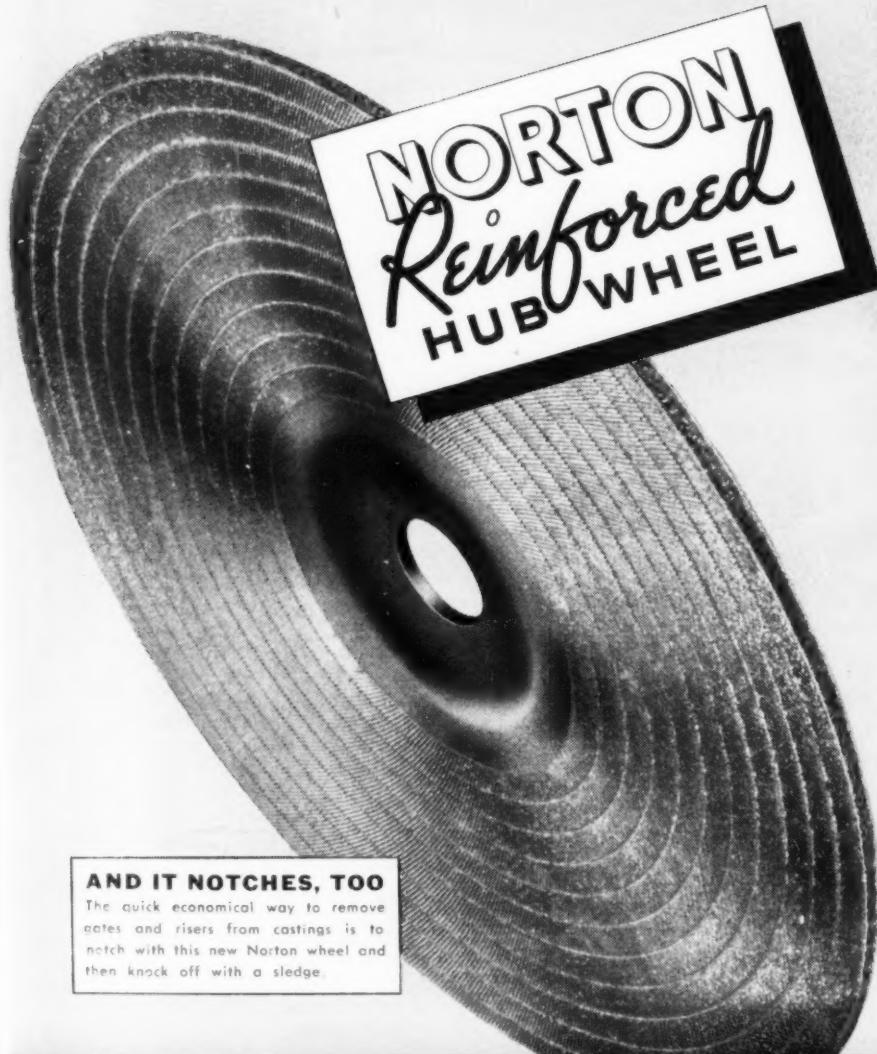


OMER E. *Robbins* COMPANY

Manufacturers of the MAGNA-SINE and Other Precision Tools

5722 Twelfth Street • Detroit 8, Michigan

# *It Cuts.. It Smooths..*



NORTON  
*Reinforced*  
HUB WHEEL

#### **AND IT NOTCHES, TOO**

The quick economical way to remove gates and risers from castings is to notch with this new Norton wheel and then knock off with a sledge.

Abrasives - Grinding Wheels - Grinding and Lapping Machines - Refractories - Porous Mediums - Non-slip Floors - Norbide Products - Labeling Machines

# Now you can Cut, Rough Grind and Finish Grind with the Same Wheel!

## STRONGER and SAFER

Comparison will convince you that the new NORTON REINFORCED Hub Wheel is a stronger, safer wheel for use on your right-angle portable grinders and sanders. Layers of strong, fibrous material, plus a special safety web molded into the back of each wheel, prevent it from flying apart in use even though accidental breakage should occur.

## FASTER CUTTING

Comparison will convince you that this new Norton wheel cuts as fast, and often faster than other wheels of similar type. It cuts fast and clean without spalling and loading, because it contains sharp, durable ALUNDUM abrasive, a special resinoid bond and has a unique file-like cutting surface.

## LONGER LIFE

Comparison will convince you that you get longer, more economical life with a NORTON REINFORCED Hub Wheel — the strongest, most durable wheel of its type on the market. Many plants have discovered that this wheel lasts two to three times longer than wheels used previously.

## VERSATILE

And comparison will prove to you that this wheel is really versatile. Now you can rough and finish grind with the same wheel — and you can notch with it too!

Try this wheel  
yourself —  
contact your  
Norton abra-  
sive engineer  
or distributor.



Rough grinding heavy weld bead prior to finish grinding with same wheel.



Notching risers on ferrous casting prior to knocking off with sledge.



Smoothing surface of large brass casting.  
Note how easily wheel gets into corner.

W-1288

NORTON COMPANY, WORCESTER 6, MASS. • Warehouses in Five Cities • Distributors in All Principal Cities

4. Die life is adversely affected by hardness of the material rolled.
5. Bending, slivers, truncated threads, and seams can result on some types of materials and some types of operations.

#### **Procedure for Thread Rolling**

An increasing number of blanks to be used for thread rolling are turned out on automatic screw machines or turret lathes; however, the popular method is still to prepare the blanks by cold heading. Should the screws need to be extremely accurate it is advisable to perform a grinding operation on the blank. In any event, the diameters of the blanks must be kept uniform to achieve uniformity of the resulting threads. Further, die life will be greatly increased if the blanks are all of one dimension.

Blanks must be absolutely round. Out-of-round blanks tend to slip and roll and wear the die, and while they can be rolled, the thread rolling process does not entirely eliminate out-of-roundness.

The end of blanks should have 60° rather than 90° included angles. Excessive die chipping may be caused by blanks having an included angle of 90°.

Necks adjacent to shoulders, commonly required for cut or ground threads, are unnecessary and in some cases detrimental to good rolling.

When gimlet-point screws are to be rolled the blanks should be partially pointed before attempting to roll.

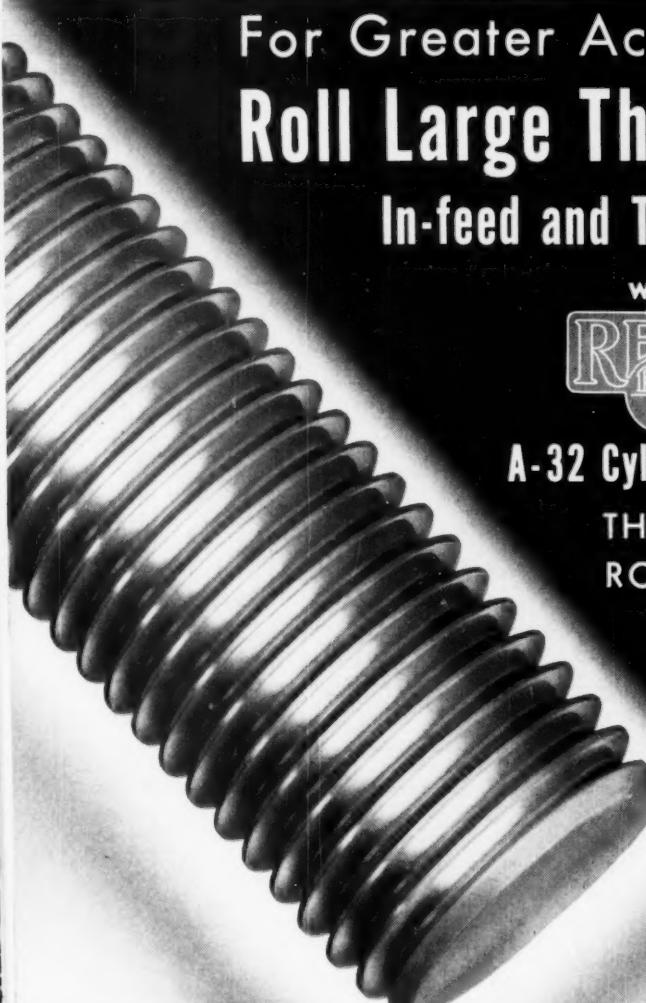
The versatility of the thread rolling process is limited only by the ingenuity of the engineer and his staff. In this short article it has been impossible to do more than touch the high spots of this process. The manufacturers of thread rolling equipment, who are listed on the following pages, are available for counsel and are prepared to make recommendations regarding the proper uses of thread rolling equipment.

The author is indebted to the following for sketches, photographs, and textual material:

Reed Rolled Thread Die Co.  
Watson-Flagg Machine Co.  
A.S.T.E. Tool Engineer's Handbook



**"Get a load of the new member!"**



# For Greater Accuracy Roll Large Threads In-feed and Thru-feed



**A-32 Cylindrical Die  
THREAD  
ROLLER**

**Increase Fatigue Strength  
Save Expensive Material**

*Send us specifications of your requirements and  
let us supply you with complete information.*

## **REED ROLLED THREAD DIE CO.**

Manufacturers of  
THREAD ROLLING MACHINES AND DIES • KNUURLS • THREAD ROLLS  
Worcester 2, Massachusetts, U.S.A.

MT-015

**AMERICAN NATIONAL SCREW THREAD STANDARDS**  
**COARSE THREAD SERIES**

**CLASS 1 FIT**

**CLASS 2 FIT**

Size of Screw	Threads per inch	Pitch diameter		Pitch diameter			
		App.	Blank	Diameter	App.	Blank	Diameter
		Inches	Inches	Inches	Inches	Inches	Inches
1	64	<b>.0622</b>	<b>.0596</b>	<b>.0629</b>	<b>.0610</b>		
2	56	<b>.0736</b>	<b>.0708</b>	<b>.0744</b>	<b>.0724</b>		
3	48	<b>.0846</b>	<b>.0815</b>	<b>.0855</b>	<b>.0833</b>		
4	40	<b>.0948</b>	<b>.0914</b>	<b>.0958</b>	<b>.0934</b>		
5	40	<b>.1078</b>	<b>.1044</b>	<b>.1088</b>	<b>.1064</b>		
6	32	<b>.1166</b>	<b>.1128</b>	<b>.1177</b>	<b>.1150</b>		
8	32	<b>.1426</b>	<b>.1388</b>	<b>.1437</b>	<b>.1410</b>		
10	24	<b>.1616</b>	<b>.1570</b>	<b>.1629</b>	<b>.1596</b>		
12	24	<b>.1876</b>	<b>.1830</b>	<b>.1889</b>	<b>.1856</b>		
1/4	20	<b>.2160</b>	<b>.2109</b>	<b>.2175</b>	<b>.2139</b>		
5/16	18	<b>.2748</b>	<b>.2691</b>	<b>.2764</b>	<b>.2723</b>		
3/8	16	<b>.3326</b>	<b>.3263</b>	<b>.3344</b>	<b>.3299</b>		
7/16	14	<b>.3890</b>	<b>.3820</b>	<b>.3911</b>	<b>.3862</b>		
1/2	13	<b>.4478</b>	<b>.4404</b>	<b>.4500</b>	<b>.4448</b>		
9/16	12	<b>.5060</b>	<b>.4981</b>	<b>.5084</b>	<b>.5028</b>		
5/8	11	<b>.5634</b>	<b>.5549</b>	<b>.5660</b>	<b>.5601</b>		
3/4	10	<b>.6822</b>	<b>.6730</b>	<b>.6850</b>	<b>.6786</b>		
7/8	9	<b>.7997</b>	<b>.7897</b>	<b>.8028</b>	<b>.7958</b>		
1	8	<b>.9154</b>	<b>.9043</b>	<b>.9188</b>	<b>.9112</b>		

**CLASS 3 FIT**

**CLASS 4 FIT**

Size of Screw	Threads per inch	Pitch diameter		Pitch diameter			
		App.	Blank	Diameter	App.	Blank	Diameter
		Inches	Inches	Inches	Inches	Inches	Inches
1	64	<b>.0629</b>	<b>.0615</b>	<b>.0629</b>			
2	56	<b>.0744</b>	<b>.0729</b>	<b>.0744</b>			
3	48	<b>.0855</b>	<b>.0839</b>	<b>.0855</b>			
4	40	<b>.0958</b>	<b>.0941</b>	<b>.0958</b>			
5	40	<b>.1088</b>	<b>.1071</b>	<b>.1088</b>			
6	32	<b>.1177</b>	<b>.1150</b>	<b>.1177</b>			
8	32	<b>.1437</b>	<b>.1418</b>	<b>.1437</b>			
10	24	<b>.1629</b>	<b>.1605</b>	<b>.1629</b>			
12	24	<b>.1889</b>	<b>.1865</b>	<b>.1889</b>			
1/4	20	<b>.2175</b>	<b>.2149</b>	<b>.2178</b>	<b>.2165</b>		
5/16	18	<b>.2764</b>	<b>.2734</b>	<b>.2767</b>	<b>.2752</b>		
3/8	16	<b>.3344</b>	<b>.3312</b>	<b>.3348</b>	<b>.3332</b>		
7/16	14	<b>.3911</b>	<b>.3875</b>	<b>.3915</b>	<b>.3897</b>		
1/2	13	<b>.4500</b>	<b>.4463</b>	<b>.4504</b>	<b>.4485</b>		
9/16	12	<b>.5084</b>	<b>.5044</b>	<b>.5089</b>	<b>.5069</b>		
5/8	11	<b>.5660</b>	<b>.5618</b>	<b>.5665</b>	<b>.5644</b>		
3/4	10	<b>.6850</b>	<b>.6805</b>	<b>.6856</b>	<b>.6833</b>		
7/8	9	<b>.8028</b>	<b>.7979</b>	<b>.8034</b>	<b>.8010</b>		
1	8	<b>.9188</b>	<b>.9134</b>	<b>.9195</b>	<b>.9168</b>		

# AMERICAN NATIONAL SCREW THREAD STANDARDS

## FINE THREAD SERIES

### CLASS 1 FIT

### CLASS 2 FIT

Size of Screw	Threads per inch	Pitch diameter		Pitch diameter	
		App. Blank Diameter		App. Blank Diameter	
		Max.	Min.	Max.	Min.
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
0	80	.0512	.0488	.0519	.0502
1	72	.0633	.0608	.0640	.0622
2	64	.0752	.0726	.0759	.0740
3	56	.0866	.0838	.0874	.0854
4	48	.0976	.0945	.0985	.0963
5	44	.1093	.1061	.1102	.1079
6	40	.1208	.1174	.1218	.1194
8	32	.1449	.1413	.1460	.1435
10	32	.1686	.1648	.1697	.1670
12	28	.1916	.1873	.1928	.1897
1/4	28	.2256	.2213	.2268	.2237
5/16	24	.2841	.2795	.2854	.2821
3/8	24	.3466	.3420	.3479	.3446
7/16	20	.4035	.3984	.4050	.4014
1/2	20	.4660	.4609	.4675	.4639
9/16	18	.5248	.5191	.5264	.5223
5/8	18	.5873	.5816	.5889	.5848
3/4	16	.7076	.7013	.7094	.7049
7/8	14	.8265	.8195	.8286	.8237
1	14	.9515	.9445	.9536	.9487

### CLASS 3 FIT

### CLASS 4 FIT

Size of Screw	Threads per inch	Pitch diameter		Pitch diameter	
		App. Blank Diameter		App. Blank Diameter	
		Max.	Min.	Max.	Min.
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
0	80	.0519	.0506		
1	72	.0640	.0627		
2	64	.0759	.0745		
3	56	.0874	.0859		
4	48	.0985	.0969		
5	44	.1102	.1086		
6	40	.1218	.1201		
8	32	.1460	.1442		
10	32	.1697	.1678		
12	28	.1928	.1906		
1 1/4	28	.2268	.2246	.2270	.2259
5/16	24	.2854	.2830	.2857	.2845
3/8	24	.3479	.3455	.3482	.3470
7/16	20	.4050	.4024	.4053	.4040
1/2	20	.4675	.4649	.4678	.4665
9/16	18	.5264	.5234	.5267	.5252
5/8	18	.5889	.5859	.5892	.5877
3/4	16	.7094	.7062	.7098	.7082
7/8	14	.8286	.8250	.8290	.8272
1	14	.9536	.9500	.9540	.9522

### BRITISH STANDARD WHITWORTH

Identification		Basic diameters		
Size of Screw	Threads per inch	Major diameter	Pitch diameter App. Blank diameter	Minor diameter
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
1/8	40	.1250	<b>.01090</b>	.00930
1/16	24	.1875	<b>.1608</b>	.1341
1/4	20	.2500	<b>.2180</b>	.1850
5/16	18	.3125	<b>.2769</b>	.2413
3/8	16	.3750	<b>.3350</b>	.2950
7/16	14	.4375	<b>.3918</b>	.3461
1/2	12	.5000	<b>.4466</b>	.3932
9/16	12	.5625	<b>.5091</b>	.4557
5/8	11	.6250	<b>.5668</b>	.5086
11/16	11	.6875	<b>.6293</b>	.5711
3/4	10	.7500	<b>.6860</b>	.6220
7/8	9	.8750	<b>.8039</b>	.7328
1	8	1.0000	<b>.9200</b>	.8400

### BRITISH ASSOC. STANDARD THREAD

Identification		Basic diameters		
Size of Screw	Threads per inch (approx.)	Major diameter	Pitch Diameter App. Blank diameter	Minor diameter
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
0	25.4	0.2362	<b>.01126</b>	.01890
1	28.2	.2087	<b>.1874</b>	.1661
2	31.3	.1850	<b>.1659</b>	.1468
3	34.8	.1614	<b>.1441</b>	.1268
4	38.5	.1417	<b>.1262</b>	.1106
5	43.1	.1260	<b>.1120</b>	.0980
6	47.3	.1102	<b>.0976</b>	.0850
7	52.9	.0984	<b>.0870</b>	.0756
8	59.1	.0866	<b>.0784</b>	.0661
9	65.1	.0748	<b>.0656</b>	.0563
10	72.6	.0669	<b>.0587</b>	.0504

### BRITISH STANDARD FINE

Identification		Basic diameters		
Size of Screw	Threads per inch	Major diameter	Pitch diameter App. Blank diameter	Minor diameter
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
3/16	32	0.1875	<b>.01675</b>	0.1475
7/32	28	.2188	<b>.1959</b>	.1730
1/4	26	.2500	<b>.2254</b>	.2008
9/32	26	.2812	<b>.2566</b>	.2320
5/16	22	.3125	<b>.2834</b>	.2543
3/8	20	.3750	<b>.3430</b>	.3110
7/16	18	.4375	<b>.4019</b>	.3683
1/2	16	.5000	<b>.4600</b>	.4200
9/16	16	.5625	<b>.5225</b>	.4825
5/8	14	.6250	<b>.5793</b>	.5336
11/16	14	.6875	<b>.6418</b>	.5961
3/4	12	.7500	<b>.6966</b>	.6432
13/16	12	.8125	<b>.7591</b>	.7057
7/8	11	.8750	<b>.8168</b>	.7586
1	10	1.0000	<b>.9360</b>	.8720

### INTERNATIONAL STANDARD THREAD

Identification		Basic diameters		
Size of x Pitch Screw	Threads per inch (approx.)	Major Diameter	Pitch Diameter App. Blank diameter	Minor Diameter
M.M.		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
3 x 0.55	46.19	0.1181	<b>.01040</b>	0.0900
4 x 0.70	36.28	.1575	<b>.1396</b>	.1217
5 x 0.85	29.88	.1968	<b>.1751</b>	.1534
6 x 1.00	25.40	.2362	<b>.2107</b>	.1851
7 x 1.00	25.40	.2756	<b>.2500</b>	.2245
8 x 1.25	20.32	.3150	<b>.2830</b>	.2511
9 x 1.25	20.32	.3543	<b>.3224</b>	.2904
10 x 1.50	16.94	.3937	<b>.3553</b>	.3170
11 x 1.50	16.94	.4331	<b>.3947</b>	.3564
12 x 1.75	14.51	.4724	<b>.4277</b>	.3830
14 x 2.00	13.70	.5512	<b>.5000</b>	.4489
16 x 2.00	12.70	.6299	<b>.5788</b>	.5276
18 x 2.50	10.16	.7087	<b>.6447</b>	.5808
20 x 2.50	10.16	.7974	<b>.7235</b>	.6595
22 x 2.50	10.16	.8661	<b>.8022</b>	.7382
24 x 3.00	8.47	.9449	<b>.8682</b>	.7915
27 x 3.00	8.47	1.0630	<b>.9863</b>	.9095
30 x 3.50	7.26	1.1811	<b>1.0916</b>	1.0020

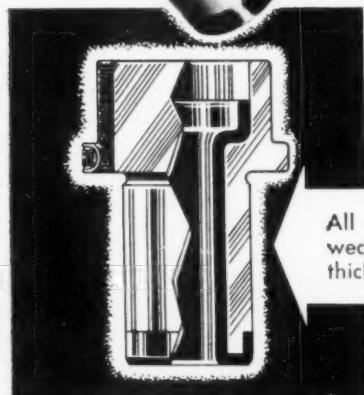
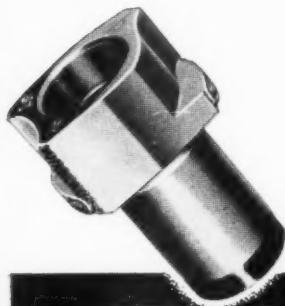


# Revere REVOLUTIONARY \*



## DRILL BUSHINGS

NEW \* RUGGED \* ECONOMICAL



In 1919 W. R. Fisher offered the first standard drill bushings for sale. In 1934 he succeeded in getting the A.S.A. standards adopted by the trade, then in 1949 Mr. Fisher developed the new revolutionary method of making drill bushings. The results of 30 years of continuous bushing experience will further benefit the trade by lower cost, higher quality and new services.

### QUALITY

Revere Revolutionary Drill Bushings wearing surface equal to tungsten carbide.

### LOW COST

Revere Revolutionary Drill Bushings wearing surface assembled in a die cast body.

### SERVICE

Revere Revolutionary Drill Bushings assembled from large stocks near you.

All the accuracy of the solid type bushing with a wearing surface of high grade material .030 to .050 thick assembled in a die cast body.

*Revere Fisher* ENGINEERING CO.  
LEXINGTON, MICHIGAN

## American Manufacturers of Thread Rolling Machines, Listed with Type of Machine, Model Number and Major Specifications

### REED ROLLED THREAD DIE TYPE A32

Reed A 32 Cylindrical Die Thread Roller (horizontal type) extends the application of thread rolling to 4" diameter threads. The work blank is supported and positioned horizontally between three synchronously rotating cylindrical dies. The three dies act on the blank simultaneously and hold it rigidly in proper rolling position.

The rolling pressure causes the material to follow the pattern of the dies which always remain in match during rolling. Control of work dimensions is accomplished by positive adjustments for diameter, length and taper. Adjustable scroll rings in the head provide for approximate setting of the dies, while the final sizing of the work is easily obtained by a micrometer adjustment.

The penetration of the dies is controlled by a mechanical feed using a positive cam action.

The drives that rotate the dies and control the feed are independently operated by individual motors.

Reed Rolled Thread Die Co., 237 Chandler St., Worcester, Mass.



### NATIONAL ACME MODEL TR-1

Model TR-1 is designed primarily for threading standard or hollow parts ranging from the smallest to 1½ inch diameter.

The head is mounted in a heavy frame housing. On its outer face is a one piece cam ring, back-supported in the frame on anti-friction rollers. On the face of the head the cam actuated roll-guide slides are mounted on anti-friction rolls directly in line with the outer rolls. The slides are kept in contact with the cam ring by spring plungers.

A third set of anti-friction rolls, located on the spindle ends, have non-revolving outer races which bear on the guide holders and inner races studded to the work roll spindles.

An electric motor drives two hydraulic units, one for rotating the roll spindles, the other for operating the piston controlled rack which oscillates the cam ring.

The machine accommodates four standard heads which collectively cover a work range of  $\frac{1}{8}$  inch to 1½ inch diameter. The 3-roll head ranges are  $\frac{3}{8}$  to 9 16 inch, 9 16 to 1 inch, and 1 to 1½ inch.

This type is generally recommended for the heavier work in the harder materials, also for hollow work on thin walled stock where contact of 3 rolls are needed to compensate pressures and avoid out-of-round distortions.

The 2-roll head accommodates stock sizes up to 9 16 inch in diameter.

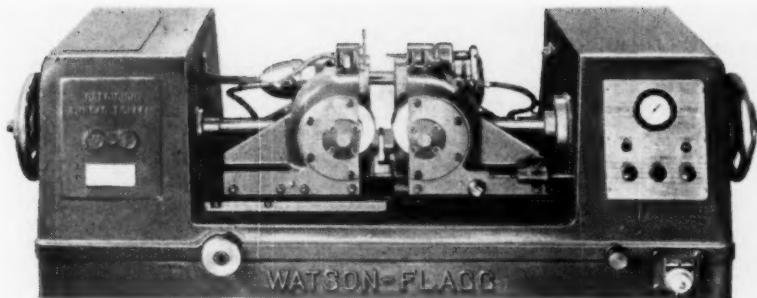
The National Acme Co., 170 East 131st St., Cleveland, O.

### WATSON-FLAGG MODEL C

The ability to roll continuous threads, knurls, or serrations is one of the features added to the new model "C".

A heavy frame has been provided to allow for 72 per cent higher hydraulically applied rolling pressures to accommodate higher physical properties of material, greater diameter and pitch thread sizes, as well as increased length of work. The machine will now take diameters from .38" up to 4" with a maximum of 8 pitch. Its regular length of thread capacity, when through-rolling is not being used, is 2½" standard, 3½" maximum.

Thread knurls or serrations are formed



as the blank is rotated between two cylindrical dies of  $6\frac{1}{2}$  inches average diameter. These large dies provide high surface rolling speeds (200 to 540 feet per minute) and an average of 20.4 inches of

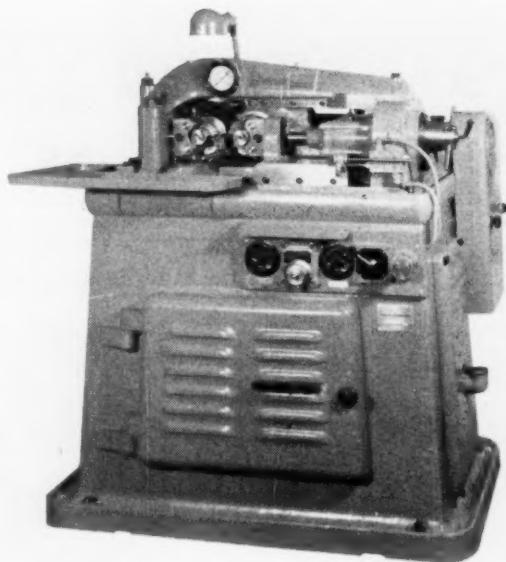
useful circumference which factors combine to provide maximum output and die life.

**Watson-Flagg Machine Co., 845 East 25th St., Paterson, N. J.**

#### STEINLE CENTERLESS THREAD GENERATOR

This unit rolls precision threads on parts which have been made from pre-heat treated high tensile alloys, stainless and soft steels and non-ferrous metals. The hardened steel rolls have their periphery faces precision ground in an exact negative pattern of the helix angle, pitch and form of the thread which is to be generated. One roll revolves around a stationary axis; the sizing operation is controlled by the in-feeding roll, backed up with a wide dove-tailed slide which advances to a predetermined depth controlled by a patented design of stop bar, through a system of limit switches and electrical timers, and stays in to depth for the correct length of time for the particular job. When the slide returns, the back limit switch is tripped which controls the idling time in order to permit loading and unloading the machine. The idling time cycle is variable from  $\frac{1}{8}$  seconds to 15 seconds in duration.

Hydraulic controls regulate the rate of penetration of the sizing slide. As an



optional addition, a special hydraulic loading and unloading mechanism can be attached to the unit for full automatic control, incorporating positive interlocking safety devices.

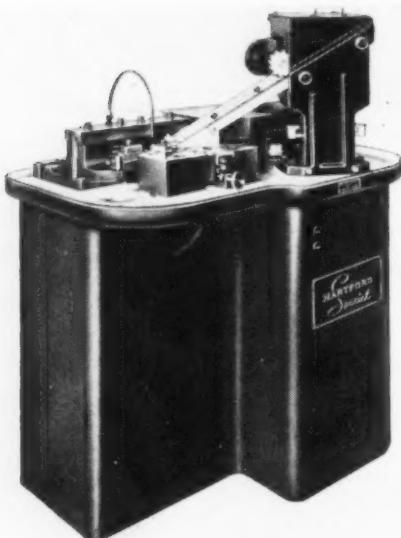
The rolls are 4" to 5" in diameter; they

are multi-start type, and are developed in a ratio of the pitch diameter of the part to be produced in order to displace the metal of the work piece uniformly without actually removing any of it, and

cause it to flow to the desired form and pitch.

The Steinle Machine Co., 170 Stanley St., New Britain, Conn.

### HARTFORD SPECIAL MACHINE MODEL A 190 H



The Model A 190 H uses flat dies and rolls class 3 thread fits consistently. Very fine adjustments for thread fit can be made on the moving die while the machine is running.

Large hopper feeds blanks into slide automatically. Clearing wheel ejects blanks improperly positioned in slide. Short blanks are fed successfully even when weight of stock in head equals or exceeds weight in shank. Machine can be furnished without a hopper.

Table top working facilitates set-ups, inspection and access to parts. Changeover accomplished quickly with simple adjustments, eliminating shimming dies. Feed rail can be adjusted without disturbing hopper. Die matching is simplified by eccentric adjustment at pitman bearing.

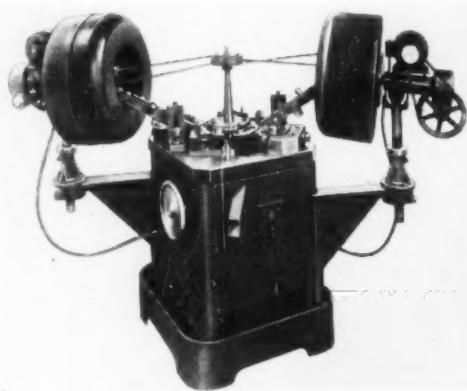
Filtered oil is continuously supplied to vital parts including dies. Pitman and slides are pressure lubricated.

The Hartford Special Machine Co.,  
287 Homestead Ave., Hartford, Conn.

### D. H. PRUTTON ROLLMASTER

The Rollmaster machines are adjustable, so as to handle a variety of different heads and sizes which have formerly been considered special feeding problems. Galleys are adjustable for width, height, angle, head sizes, etc.; hoppers are adjustable for height, angle, both horizontal and vertical, to adjust for difference in spill characteristics found in parts of different weights and sizes. Hoppers also have variable speed drive.

The top plate is a solid plate of high carbon steel,  $2\frac{3}{8}$ " thick. The top spindle bearing is set directly in this plate. Both main spindle bearings, Timken tapered rollers, are running at one-tenth actual load capacity in the Rollmaster. This, combined with the short mo-



ment arm on our die holders, make the Rollmaster a machine, which, for all practical purposes, is deflectionless.

The setup wheel, shown on the left side of the machine, is connected directly to the main spindle and provides facility for turning the work through the dies by hand in order to make setup adjustments.

The feeding finger is driven from the

cam plate in the center of this photo. Cam plate provides adjustment to time feeding finger with leading edges of center die segments. This feed drive mechanism is spring suspended to allow harmless flexing of these springs in the event that oversize stock cause feeding difficulties.

D. H. Prutton Machinery & Tool Co., 5295 West 130th St., Cleveland, O.

Company and Type of Machine	Model No.	Capacity	Die Size	Production
D. H. Prutton Mach. & Tool Co., 5295 W. 130th St., Cleveland, O.				
ROTARY	100	bolt range No. 8 to $\frac{1}{4}$ "	1 $\frac{1}{8}$ " max. $\frac{1}{8}$ " min	25,000 pr/hr
	120	bolt range No. 8 to $\frac{1}{4}$ "	2 $\frac{1}{8}$ " max. $\frac{1}{8}$ " min	25,000 pr/hr
	200	bolt range $\frac{1}{4}$ to $\frac{1}{2}$ "	3" max. $\frac{1}{2}$ " min	11,000 pr/hr

Company and Type of Machine	Model No.	Capacity	Die Size	Production
E. J. Manville Div., The National Mach. Co., Tiffin, O.				
HORIZONTAL RECIPROCATING	188 C	3-16"	3-3/32" stationary 3 $\frac{1}{8}$ " moving	15 cycles pr/min hand fed; 130 cycles pr/min automatic feed
	250 C	5-16"	5" stationary 5 $\frac{1}{8}$ " moving	60 hand; 120 auto.
	375 C	$\frac{1}{8}$ "	6" stationary 6 $\frac{1}{4}$ " moving	60 hand; 100 auto.
	500 C	$\frac{1}{2}$ "	7 $\frac{1}{2}$ " stationary 8 $\frac{1}{8}$ " moving	60 hand; 80 auto.
	625 C	$\frac{1}{8}$ "	9" stationary 10" moving	35 hand; 65 auto.
	750 C	$\frac{1}{4}$ "	11" stationary 12" moving	45 hand; 50 auto.
	1000 D	1"	16" stationary 21" moving	35 hand; 45 auto.

Remarks: National also makes a 1" and a 1  $\frac{1}{2}$ " vertical machine for rolling threads on bolt blanks and rods of all lengths. Capacities: 1" x 3" long in one operation. Also rolls threads  $\frac{1}{8}$ " x 4";  $\frac{1}{4}$ " x 5" long.

Company and Type of Machine	Model No.	Capacity	Die Size	Production
Reed Rolled Thread Die Co. 237 Chandler St. Worcester 2, Mass.				
CYLINDRICAL DIE TYPE	A22 vertical	to $2\frac{1}{8}$ "	$3\frac{1}{8}$ " max. $1\frac{1}{8}$ " min.	to 2100 pr/hr
	A23 horizontal	to $2\frac{1}{8}$ "	$3\frac{1}{8}$ " max. $1\frac{1}{8}$ " min	to 2100 pr/hr
	A32 horizontal	to 4"	$5\frac{1}{8}$ " max. $2\frac{7}{8}$ " min	to 1500 pr/hr

Company and Type of Machine	Model No.	Capacity	Die Size	Production
Hartford Special Mach. Co. 287 Homestead Ave. Hartford 5, Conn.				
FLAT DIE	A-190-II	No. 2-No. 10 mach. screw threads $\frac{1}{8}$ "- $1\frac{1}{2}$ " long	$2\frac{1}{4}$ " face stationary die. $3\frac{1}{4}$ " face moving die.	120-160 pc/min.

**Remarks:** Machine is suitable for rolling standard screw threads, gimlet points, drive screws, screwhails and other special threads, as well as do knurling, grooving, and blank rolling. Machine features: ease of die matching; fine adjustment for thread fit; rugged construction with great in-built accuracy; automatic hopper feed provided; may be hand fed if desired.

Company and Type of Machine	Model No.	Capacity	Die Size	Production
The National Acme Co. 170 East 131st St., Cleveland, O.				
CYLINDRICAL DIE TYPE HYDRAULIC 2 and 3 ROLL	TR-I	see remarks*		Spindle speeds 150-300 rpm. Max. range: 75-600 rpm.

**Remarks:** Interchangeable 2-and 3-roll heads cover range from  $\frac{1}{8}$ " to  $1\frac{1}{2}$ ".  
3-roll heads in nominal capacities  $9/16$ ", 1", and  $1\frac{1}{2}$ ".  
2-roll head in  $\frac{1}{2}$ " nominal capacity.  
Length of roll: 1" on  $9/16$ " size;  $1\frac{1}{2}$ " on other sizes.  
Max. diam. for continuous rolling on ground bars with 3-roll heads: less than 7" long  $9/16$ " diam. on  $9/16$ " size; 1" on 1" and  $1\frac{1}{2}$ " sizes. Longer than 7",  $9/16$ " diam. on  $9/16$ " size;  $\frac{1}{4}$ " on 1" and  $1\frac{1}{2}$ " sizes.

Company and Type of Machine	Model No.	Capacity	Die Size	Production
Waterbury Farrel Fdry. & Mach. Co. Wilcox & Daniels St. Waterbury 86, Conn.				
HORIZONTAL- HAND FEED	00-6496-A	3/32" dia. or No. 3; 1" long.	1 1/4" stationary face	
	0-6456	5/32" dia. or No. 7; 1 1/2" long.	2" moving face	
	10-7120	1/4" dia. or No. 14; 2" long.	2 1/4" stationary 3 1/4" moving	
	20-7112	5/8" dia. or No. 24; 3" long.	4 1/4" stationary 5" moving	
	30-7113	1" dia. or No. 30; 4" long.	6" stationary 6 3/4" moving	
	40-7114	1 1/8" dia. 4 1/2" long.	7 1/2" stationary 8 1/2" moving	
	50-7115	1 1/4" dia. 5" long.	9" stationary 10" moving	
	60-6579	1" dia. 5" long.	11" stationary 12" moving	
INCLINED CHAIN FEED	20-7122	5/8" dia. or No. 24; 3" long.	15" stationary 16" moving	
	30-7123	1 1/2" dia. or No. 30; 4" long.	17" stationary 18 1/2" moving	
	40-7124	1 1/8" dia.; 4 1/2" long.	19" stationary 20" moving	
	50-7125	1 1/4" dia.; 5" long.	21" stationary 22" moving	
INCLINED LIFT BLADE FEED	00-6496	3/32" dia. or No. 3; 1" long.	1 1/4" stationary 2" moving	
	0-7186	5/32" dia. or No. 7; 1 1/2" long.	2 1/4" stationary 3 1/4" moving	
	10-7121	1/4" dia. or No. 14; 2" long.	4 1/4" stationary 5" moving	
	20-6382	5/8" dia. or No. 24; 3" long.	6" stationary 6 3/4" moving	
	30-6485	1" dia. or No. 30; 4" long.	7 1/2" stationary 8 1/2" moving	
		See Remarks.		

**Remarks:** The capacities apply only to standard thread forms. If it is not essential that a perfectly full thread be produced such as on certain grades of stove bolts, etc., the rated diameters may be exceeded somewhat. For brass, bronze, copper, etc., and for short bodies, the diameters may also be somewhat greater. But for maximum depth dies, the maximum diameters must never be exceeded.

Company and Type of Machine	Model No.	Capacity	Die Size	Production
Steinle Mach. Co. 170 Stanley St. New Britain, Conn.				
2-ROLL CYLINDRICAL DIE CENTERLESS	1	1" — 8 preheat stock; 2" soft steel stock;	5 $\frac{1}{2}$ " max. 4" min	to 2,400 hr.
	2	2 $\frac{1}{2}$ " — 4 preheat 4 $\frac{1}{2}$ " soft steel	9" max. 5" min	to 1,200 hr.

Remarks: Fully hydraulic, infinitely variable, direct acting.

Company and Type of Machine	Model No.	Capacity	Die Size	Production
Watson-Flagg Mach. Co. 845 East 25th St. Paterson, N. J.				
2-ROLL CYLINDRICAL	C	No. 6 — 4"; length 2 $\frac{1}{4}$ " Std. 3 $\frac{1}{4}$ " max.	6" diam x 2 $\frac{1}{4}$ " face	800-600 hand, 1500-800 auto.

Fred M. Shelley, Jr. and Alfred G. Denison were recently appointed to the posts of general sales manager and assistant general sales manager, respectively, of The Riverside Metal Co., Riverside, N. J. George Paterson, Jr., has been named manager of Riverside's new Special Products Division.

The L. S. Starrett Co., Athol, Mass., announces the appointment of Harry E. Masters as educational director in charge of all vocational education and industrial apprentice training programs and activities, as well as trade shows and conventions. The company also announces the appointment of C. C. Nordmark as advertising manager.

The Whiton Machine Co., New London, Conn., has announced the appointment of O. D. H. Bentley as consulting engineer on steam turbines and Eugene B. Williams in charge of the sale of Whiton Steam Turbines for U. S. Navy applications.

John W. Wilkinson is appointed general sales manager of the McKiernan-Terry Corporation, with plants at Harrison and Dover, N. J.

American Steel and Wire Co., U. S. Steel subsidiary, Cleveland, has announced the appointment of Van H. Leichliter, veteran steel maker, as assistant operating vice president.

The appointment of A. George Rogers as assistant manager of the Westinghouse Home Radio Division, Pittsburgh, was announced recently by F. M. Sloan, division manager.

A. C. Thompson has been promoted to the position of production manager for Koppers Company's Metal Products Division, Pittsburgh, it was announced by Walter F. Perkins, vice president and Division general manager; Nick Kay was appointed general superintendent of the Division's machine shops, and E. A. Franke as general superintendent of the Division's foundries.



Old and obsolete machines, like ancient warriors, belong to a bygone day. Good in their time, these machines of the past hamper production, increase costs, help your competitor.

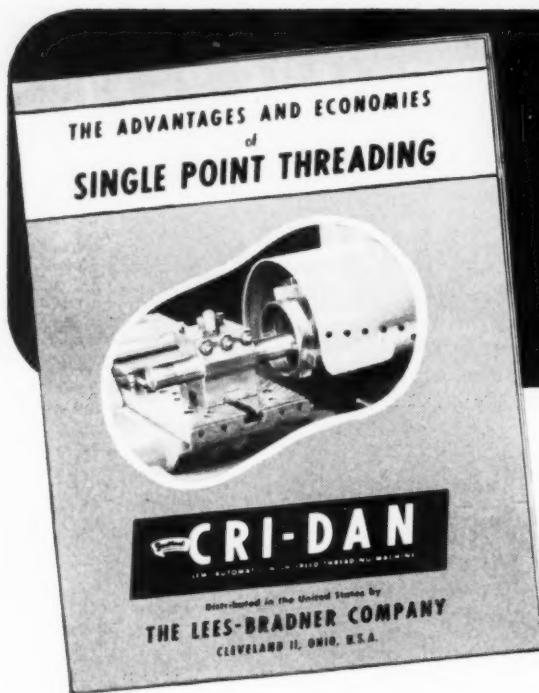
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## **HOW TO EFFECT 10%, 25%, or 50% ECONOMIES**

# *In Your Machining Operations*

by H. A. Frommelt

This is the last article in Mr. Frommelt's series on reducing machining man-hours. In this instalment Section 2, obtaining 25% economies, is concluded. Immediately following this section the author discusses the methods to be followed in obtaining 50% economies in machining man hours.

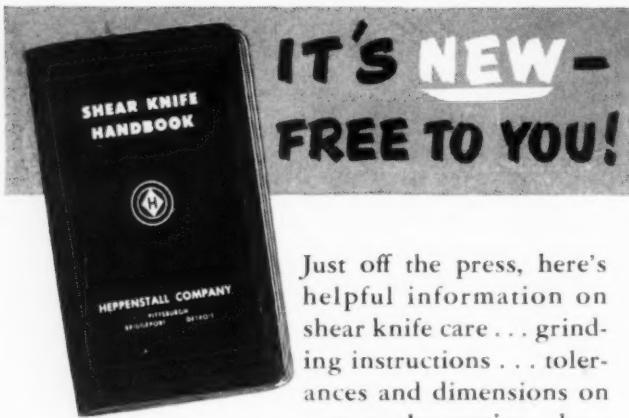
### **Section 2, Part 2**

#### **TOOL GRINDING**

**W**ITH CONVERSION to carbide tool and cutter grinding methods and techniques enter a new phase and take on new significance. Cutting and clearance angles, accepted as good practice for various materials and operating conditions when using carbide as a cutting material, are available and need not be discussed now. More important even than angles, both cutting and clearance, is the technique and equipment to be used for the grinding of carbides. At no stage of metal cutting activities is a critical situation more likely to arise than in grinding and maintenance of both single point tools and milling cutters. The reason for this is the nature of cemented carbides.

The tungsten carbides, the first of the carbide family to be developed for cutting, is somewhat less hard than the silicon carbide commonly used in abrasive wheels for tool grinding. Hence it is considered good practice to grind tungsten carbide tools, both single and multi-point, with a so-called abrasive wheel, either of silicon or aluminum oxide. These tungsten carbides are used solely for cast iron or non-ferrous materials. Hence it is common to specify abrasive when grinding for cast iron and non-ferrous carbide grades.

While this is considered acceptable practice, closely correlated information including all factors, indicates the advisability of using diamond wheels for this operation. The diamond wheel is so much harder than the abrasive wheel that for the removal of the same amount of



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tungsten carbide far less pressure is required with a diamond wheel and hence less heat is generated. If the operator is none too skilled or careful this heat generation and localization can easily result in craze marks that are the beginnings of failures. So even for tungsten carbide it is considered, if not advisable, at least better practice to specify diamond wheels for the grinding of these carbide tools that are commonly used for the machining of cast iron and the non-ferrous materials.

and its alloys, both treated and untreated. These carbides are considerably harder than the hardest abrasive, either silicon or aluminum oxides. Hence these cannot, or at least, should not be used. The fact is that a kind of grinding takes place even when these abrasives are used on or against the steel cutting grades of carbide. The fact is that the abrasive wheel by friction heats the carbide tip or bit to the point where the cobalt—the binder for the powdered particles of tungsten, titanium and carbon—plasticizes and per-

Greater care is required with brazed tip tools and cutters in the grinding than with the solid carbide design, both in the single and multi-blade type. The stresses resulting from the brazing frequently result in a ruptured tip after the first pass of the abrasive or diamond wheel. Unfortunately, the brazed tip is always in tension on the cutting side and when these stresses are relieved upon grinding the tip fails at times. If not, the grinding operator must keep in mind that the brazed piece of carbide is already under stress to which, if grinding stresses are added, the breaking or rupturing point may be reached. No cut deeper than .0005" should be taken on carbide per pass; and less than that will give even more satisfactory results.

Tungsten titanium carbides, or variations, have been developed for the cutting of steel

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mits the fine particles of the harder materials to drop out of the cobalt matrix. Hence, these steel cutting grades can be ground after a fashion but seldom if ever without serious effects which are revealed immediately on the production line in terms of shortened tool life.

The steel cutting grades of carbide (tungsten titanium carbide) should always, without reservation, be ground and conditioned, both in the roughing and finishing cuts or passes with a diamond wheel. The reconditioning time is



(1) much faster;  
(2) no damage—at least appreciable—is done to the tool and the overall grinding cost is considerably lower by actual cost accounting records.

The problem of diamond wheels has been satisfactorily solved after a considerable period of conflicting claims and counter claims. Generally speaking, three kinds of diamond wheels are available — differing in their bond of matrix which holds the diamond cutting particles. The first of these is a metallic bond; the second a resinoid bond; and the third a type of bond that is not as hard and unyielding as the metallic, and yet not as soft and pliable as the resinoid. The in-between bond is considered advisable for carbide grinding.

When a diamond wheel engages a material such as carbide it's action is much the same as a milling cutter with the innumerable particles of diamond dust acting like teeth of blades to cut the carbide. As these teeth, the sharp edges of the fine particles, become dull the cutting pressure is increased until the particle either breaks off, falls out, or turns in its matrix. The latter result is the desirable one since these particles have relatively a large number of sharp cutting edges with which to reduce the hard carbide.

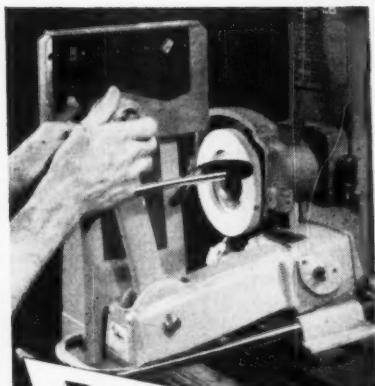
The metallic bond is too unyielding, ending usually in an early reduction or even destruction of the diamond wheel



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visible; here the action is both as a coolant and a cleanser. But when using diamond wheels the sole purpose of the kerosene fed to the wheel by means of a wick, and not in a flood, is to prevent loading.

Training of tool and cutter grinders is one of the most critically needed bits of industrial education in American industry to-day. Excessive metal cutting costs, where they exist, and they are all too common, usually begin with poor, wrong, or wholly unsatisfactory grinding

sis on this phase of metal cutting in this exposition of the three Economy Stages in metal cutting.

An intelligent operator or tool grinder hand can be trained in a relatively short period of time providing he does not carry with him the prejudices of another era and other techniques. There is no reason whatsoever for a manufacturing plant not undertaking economies through conversion to carbide. This has been borne out by the results from numerous conversion economy programs.

of tools, particularly where carbide is being used. The older cutting materials are not so sensitive to abuse from the grinder hand as carbides are. Some grades, particularly the extremely hard grades used for steel cutting and for finishing, are even more temperamental. Only skilled and intelligent handling of these prima donnas gives results. It is all too true that many manufacturing facilities have and still are deterred from converting generally to carbide solely because of the grinding problem. And yet a little attention in terms of training suitable personnel is all that is required. One of the first points of attack in applying these three stages of metal removal economy is grinding. Experience indicates that time taken out for this vital subject at the outset pays excellent dividends. Hence the emphasis

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### FIXTURES

In this second or 25% stage the problem of handling components or workpieces becomes something of a problem. It is not until actual cutting time has been reduced that the slow and out-moded methods of mounting or holding the workpiece impress themselves on the management. What's the good if a floor-to-floor time of 15 minutes, in which the cutting time is 5 minutes, is reduced by 50% in the cutting time? This leaves the floor-to-floor time  $13\frac{1}{2}$  minutes, which represents an overall reduction of

17%. And yet the cutting time has been reduced 50%. While the saving of 17% is worthwhile and acceptable, still in all too many instances the handling and set-up time can and should be reduced. Much attention should be directed to this phase of machining if the full results of the newer techniques, methods and materials are to be realized.

### VISES

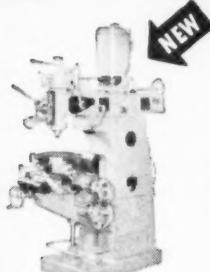
Aside from toolroom or one piece operations there is little excuse for using the usual vise for operations in regular production set-ups with job lots of several or more pieces. Air and hydraulic equipment in this field are now so satisfactory that it should be used when more expensive fixtures are not warranted. The application of a quick-operating holding device should always be considered when the metal cutting time can be reduced with the application of the newer methods.

In a jobbing shop that took on the manufacture of a piece of railway baggage equipment the saving in handling time was 50% over the old table bolt, nut and clamping arrangement with the substitution of an air operated vice. Since the cutting time was reduced by 75% with the application of carbide cutting tools, the overall reduction was considerable. But had the old handling and set-up time prevailed the saving (floor-to-floor time) would have been a mere 37.5% although the cutting time was reduced by 75%.

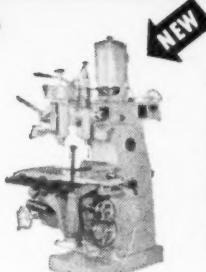


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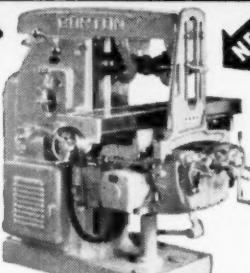
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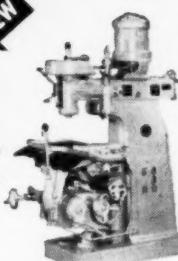
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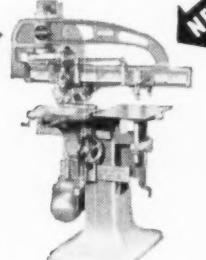
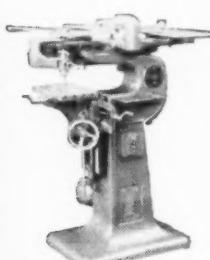


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For precision turning  
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from .005" dia. by  
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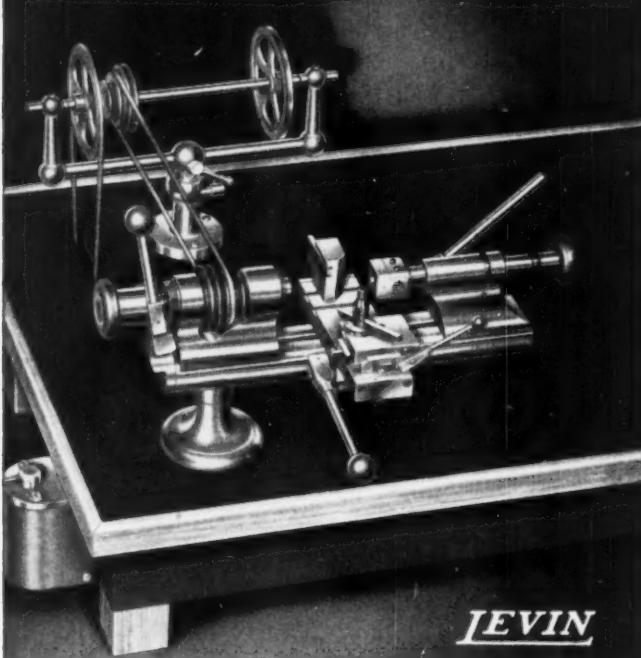
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### SIMPLE HOLDING FIXTURES

Frequently a little ingenuity can be applied to the holding problem with good results. An expensive fixture is never justified if the job lot size is small and today, with the rapid cutting methods and techniques, job lots of 50 are looked upon as small when fixturing is in question.

Simple clamping devices are easily and quickly designed and put together in the shop with little or no expense and these

are sufficiently effective to reduce the set-up time and bring it within the range of metal cutting reduction. This cannot be a treatise on holding and clamping equipment and methods. Suffice the reference to cam locking devices that are easily made and as easily applied to a variety of jobs and work-pieces.

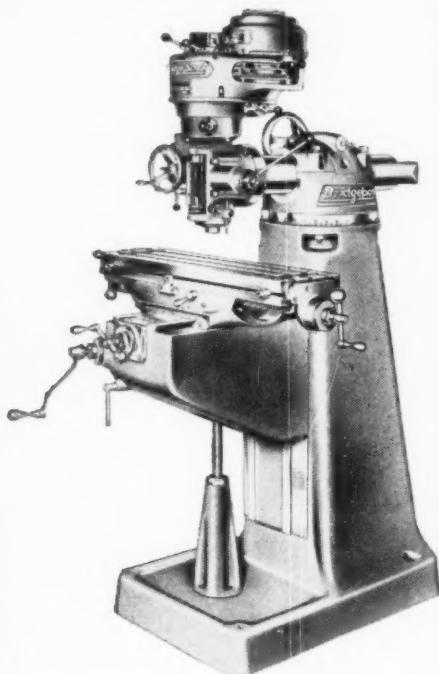
In a plant manufacturing oil burner equipment of a wide variety of sizes, table clamping methods were discarded except for a few. Not a single expensive fixture was ordered; instead, devices that could be made in the toolroom were specified. Thus at nominal cost the handling and set-up time was reduced, over all, by 43%. It requires some ingenuity, sometimes mental perspiration but the results, according to the records are well worth the effort.

### MAGNETIC CHUCKS

Magnetic chucks are now available that are suitable for the holding of larger workpieces against man-sized cutting forces. These chucks are easily and quickly adapted to a wide variety of jobs, reducing the floor-to-floor time appreciably. These devices should not be confused with the regulation magnetic, permanent or otherwise, chucks that have been in use for a generation or more. The low voltage, high holding power chuck referred to here is suitable for application to lathes, planers, and milling machines where regulation cuts are being taken at high cutting rates.

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The Bridgeport Turret Milling Machine with its New 1 H.P. Milling, Drilling and Boring Attachment has had its remarkable versatility still further extended through the development of Cherrying and Right Angle Attachments shown at work here. Furthermore the new Bridgeport Milling Machine Vise and Boring Head add greater convenience and capacity to a machine which has already found outstanding acceptance in the World's leading die shops and tool rooms as well as on the production lines of countless metal working shops.

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Manufacturers of High Speed Milling Attachments and Turret Milling Machines

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The set-up time for connecting rods (about 3 centers) was reduced by 75% on a planer with the application of this type of magnetic chuck. The milling heads on this planer were equipped with carbide cutters that milled off the bosses on the crank and wrist pin end of these rods at a feed rate of 20" per minute or sufficient to absorb the full power of a 20 H.P. motor. And these con rods were rough forgings; the first side of these bosses was milled with the rough forging face being held by the magnetic chuck.

Much set-up time can be reduced by the ingenious use and application of such equipment. The alert production manager will ever keep in mind the problem of reducing set-up time to bring it into something like conformity with the reduced cutting time which is the daily result of new developments in the metal cutting and removal field.

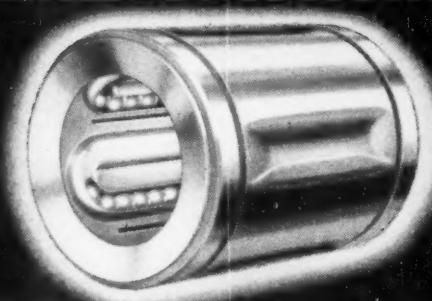
### Section 3 50% ECONOMY PROGRAM

In the third, and final stage, of the drive for economy in chip making or metal removal the substitution of the latest machine tool builders' creation for obsolescent machines is the principal activity. However, this is not undertaken without close study and analysis of the operations in question. Such study will reveal the advisability of a change in method or machine. This is called for because of changes or advances that have been made in metal removal in all major machine tools particularly since the advent of the newer cutting materials.

Moreover, the substitution of a new machine is not undertaken merely as the result of an operation analysis. Much more is involved particularly to-day with the extremely rapid advances that are being made in metal cutting and processing. In the first place, the calculated savings using new equipment must equal the purchase price in relatively few years. In other words, the machine should be amortized not on the basis of deprecia-

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PROGRESSIVE MANUFACTURERS USE BALL BUSHINGS - A MAJOR IMPROVEMENT AT A MINOR COST

**tion but obsolescence.** Unfortunately, tax department amortization regulations are entirely unsuited to present-day advances in machining techniques and processes. Still, management contemplating the purchase of new equipment, must approach the problem realistically. If the conservatively estimated savings will not actually retire a standard machine in less than five years it should not be purchased. And if the estimated savings will not retire a special machine in half that time it should not be considered. Further

study of other methods may reveal better and more economical machining but until then the purchase of new equipment is not justified.

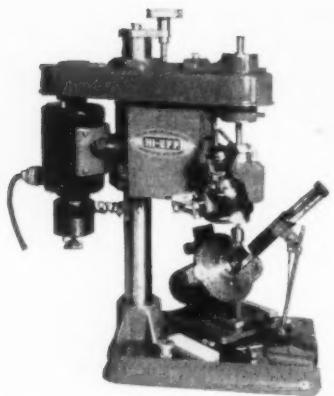
To summarize: If a new standard machine tool can show conservatively calculated savings that will equal the purchase price in five years or less its purchase may be justified. If a special machine that is designed and suitable for a particular product or workpiece and that cannot be used elsewhere either in that or another plant cannot be retired on the basis of savings within 2 or 3 years its purchase is not justified.

The modernization of a department or departments in a plant may well be done over a period of time after a careful study of operations has revealed the best methods of machining and processing. While it may be ideal to replace all obsolescent equipment of a particular kind at

once it is seldom feasible for financial reasons. The step by step modernization is satisfactory providing only such replacements are undertaken according to a carefully laid program as the result of intensive study and analysis.

The minimum of 50% savings is valid only after a complete program has been adopted and where at least one-third of the operations are modernized.

A Diesel engine manufacturer decided upon modernization of its engine base department. A careful analysis of the op-



get

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erations indicated the advisability of changing to mill-type planers using carbide throughout. Production schedules did not justify special machines. But the calculated savings indicated that such equipment would pay for themselves in four years. But the complete modernization plan was projected on a three year basis. The actual savings were greater than the calculated and hence the first equipment had retired itself by the time the last was installed.

The overall economy result was 64%; that is, 64% of the man-hours formerly required for the production of an engine base were now no longer required. Thus it was possible to increase production proportionately, using the same productive man-hours.

In addition, the tool maintenance was reduced by 35% and the investment in perishable tools shrunk 41%; 8% of assembly man-hours were eliminated due to closer tolerances and better finishes, thus obviating some fitting and scraping.

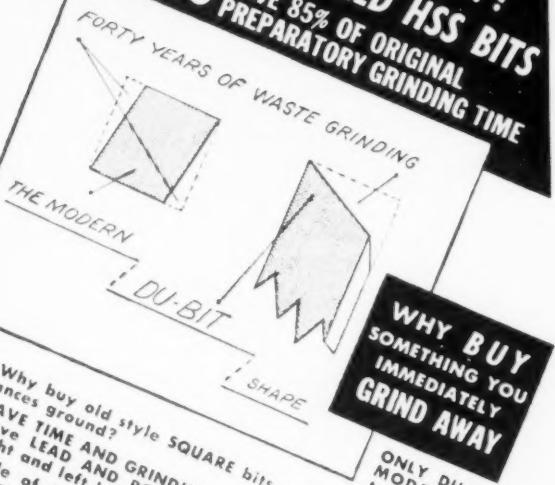
Set-up time was reduced by ingeniously devising locating blocks and hold down methods. The leveling of the engine bases was done optically with leveling devices arranged on the machine columns. The set-up time was reduced 33% while the machining time was reduced 70%, leaving better than

a 50% economy in man-hours required to produce a completed engine base on floor-to-floor basis.

### ESTABLISHING METAL REMOVAL RATE

The most important step to guarantee full usage of the potentials in a machine built for carbide machining is to establish the metal removal rate. This assumes that the workpiece has no inherent limitations such as thin sections that vibrate under cutting pressures. The following

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**THE DOW MECHANICAL CORPORATION, THOMPSONVILLE, CONN.**

steps are necessary to establish the metal removal rate:

1. Determine the continuous horse power rating of the main drive motor or motors;

2. Multiply this by the metal removal rate for the material in the workpiece; that is, by the number of cubic inches per minute of metal that can be removed per horse power using the tools and machine as available;

3. Determine the surface foot rate for he workpiece material;

4. Calculate the feed rate using the depth of cut as called for in the specifications. The following formula can be used for this purpose:

$$CIM = \frac{W \times D}{IPM}$$

where CIM equals cubic inches per minute

W equals width of the cut  
D equals depth of cut (by specification)

IPM equals inches per minute feed rate;

5. Determine the feed per tooth as follows:

$$C.L. = \frac{D \times 3.14 \times RPM \times \text{No. of teeth}}{C.L.}$$

RPM x No. of teeth  
C.L. equals chip load.

IPM equals inches per minute feed rate, D equals diameter of cutter, RPM equals the revolutions per minute of the spindle carrying the cutter and N.T. equals the number of teeth in the cutter.

6. If the chip load does not fall within reasonable limits, depending on the various factors involved in the job, change the feed rate to bring it into

line with good practice. The limits for the chip load may be taken as .005" on the low side and .015" on the high side.

The following illustrative example is taken from the records of an actual application:

1. Drive motor horse power is 50.

2. The metal removal rate is 2 cubic inches per minute per horse power. Hence the total metal to be removed should be 100 cubic inches per minute assuming continuous horse power output in the machine of 50.

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3. The SFM rate for this material (high grade cast iron) is 300 feet per minute.

4. IPM equals 100 divided by 10" (width of cut) times .300" (depth of cut). This equals 33 IPM as the feed rate.

5. The feed per tooth equals the IPM or 33 divided No. of teeth times the RPM or 20 (No. of teeth) times the 120. This equals .009" as the chip load. Since this is a good average loading per tooth the feed rate of 33" will be maintained.

Unless these calculations to determine the full metal removal rate, the full power of the machine may not be utilized. With carbide it is seldom possible to overload the cutting tool and hence it is advisable to load the machine to the full capacity of its main driving power.

#### SUMMARY

None of the recommendations in any of the three economy brackets discussed in this series proposes a single new or untried technique, tool or material. All of them involve tried methods to effect economies and all of them can and are readily appreciated by a competent production management.

In the first economy bracket the emphasis is placed on correcting abuses in methods, tools and materials.

In the second the emphasis is placed on conversion to the latest cutting materials.

And in the third, the emphasis is on replacement of obsolete tools and equipment.

These three steps are logical and must be taken in the order laid down. After abuses are corrected, new cutting materials can be applied to existing tools when the production personnel has taken these steps it can then go on to the full utilization of the latest machining equipment.

Moreover, all of these steps must precede any industrial engineering program that calls for production planning, materials handling and flow, inspection, routing time study and incentive systems. These three steps are at the bottom of them all and unless taken the industrial engineering program will be built on a false and insecure foundation.

Straighten out the metal removal practices and bring them to full efficiency with either present or new equipment. Resulting overall efficiencies in the results of productive man-hours will be appreciable and in the order of 10%, 25% and 50% as indicated. Finally, the modernization of metal removal method will lay the foundation for further efficiencies in the general industrial engineering field.

**END OF SERIES**

# OVER 20,000

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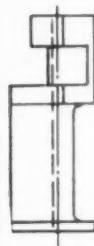
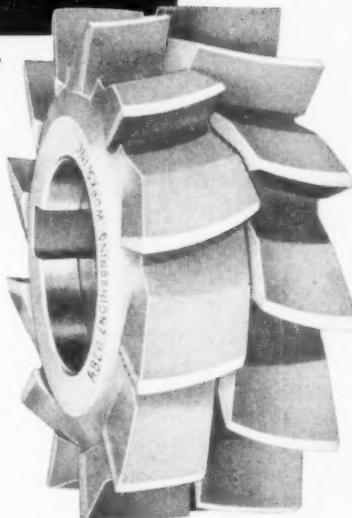
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Objectional chatter marks from standard type cutters surprisingly resulted in increasing production from 4,000 to 20,000 pieces per grind

Eight months ago a manufacturer experienced difficulty in obtaining a smooth surface on a side milling operation while using standard type cutters.

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The results proved outstanding — After eight months of continuous operation, without once removing the cutters from the machine, Aber "Curved Tooth" cutters produced 20,000 pieces against previous peak outputs ranging between 3,000 and 4,000. In addition the cutters are still producing pieces within specified tolerances and with a finish finer than that obtainable with NEW standard type cutters.



### Here Are the Facts

#### OPERATION DATA

MACHINE: U.S. Multimill

TOOL: Aber "Curved Tooth" right and left hand shear side milling cutter,  $3 \times \frac{1}{8} \times 1\frac{1}{8}$

MATERIAL: Bronze Turbine Blades

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S F M. Speed:	400fpm	400fpm
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Pieces per Grind:	20,000 and still going strong	3,000 to 4,000 maximum

You too can profit by applying Aber "Curved Tooth" milling cutters for increased production and reduced rejections due to off tolerance, unsatisfactory finish milling operations. Remember every Aber Tool has the exclusive, patented "Curved Tooth" design providing chatterless, smooth cutting action.

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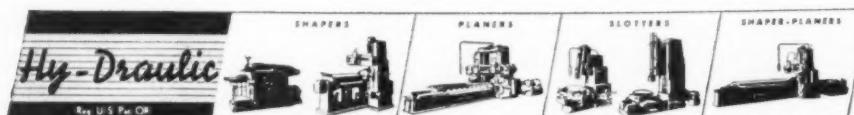


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# Foremanship Forum

by EDMUND MOTTERSHEAD

## Foremen's Meetings, the Training Conference

THE USE of the conference method in training, especially in industrial training of the supervisory organization, reached its peak in the vast industrial expansion of the recent war. The importance of the supervisor's position in industry was recognized, as were his need for skills in training workers, solving problems, and maintaining employee relations. The training conference was developed as a systematic and logical method of jointly thinking through the problems of the group in an informal and spontaneous manner, usually with the result that standard practice outlines were developed on a variety of subjects or problems.

Each training conference should be set up with a definite purpose in mind. It should have a definite aim of imparting certain knowledge or explaining certain principles and policies to the members of the group in such a way that all misunderstandings are eliminated and all members of the group are clear in their own mind as to just how these policies or facts affect them.

The National Metal Trades Association went on record as recommending the conference procedure of supervisor training for the following reasons:

1. "It pools facts and suggestions from the experiences of the foreman.
2. It stimulates an individual's desire to listen, think, and talk about his problem.
3. It develops better understanding between foremen, management, and employees.
4. It provides an effective means for interpreting, understanding, and applying plant policies.
5. It secures better teamwork through modifying viewpoints and lessening misunderstandings.
6. It aids individual members in analyzing their jobs, and in discovering more effective ways of doing them.

7. It stimulates respect for the points of view of others and will result in improved plant morale.

8. It stimulates willingness to accept and to put into practice group conclusions.

9. It helps materially in solving shop problems."

It might appear at first glance that it would be almost impossible for the conference leader to predict the course of the discussion which is about to take place. Within reasonable limits, however, he may explore the possibilities of the discussion and prepare for them. He should have, for example, a thorough understanding of his people and should know to which motive and emotion he can appeal in order to extract sympathetic response and congenial discussion from the group. Inasmuch as the training session has a definite purpose to accomplish, the conference leader should attempt to anticipate as many of the possible responses to his leading questions as he can and plan ways in which he can use these responses to clarify the objective of the training session.

In preparing a written plan for an educational conference, the chairman or conference leader needs to record the following:

1. A written statement of the objective or purpose of his conference.
2. Some brief notes as to the specific motivation to which he can appeal in order to stimulate activity and discussion in the group. Some of these motivations will be the curiosity of the individuals in the group, their personal friendship for the conference leader, their confidence in the leader, their own self-respect, their desire to make the work in their department easier, loyalty, desire for praise, ambition, interdepartmental rivalry, and a sense of responsibility.

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Others may be appealed to by giving them a chance to feel important in the contribution they are making toward the group.

3. A list of the materials and physical appurtenances of the room; blackboard, easel, chalk, erasers, scratch pads, cards, pencils, stenographer or secretary, adequate lighting, water supply, ashtrays, and other conveniences or necessary tools.

4. The chairman's opening remarks. In the actual operation of the conference, all members of the group speak, adding

their share to the general body of ideas and facts. There is a free give and take of discussion with questions and answers, information and comments being continuous throughout the entire meeting. However, the chairman introduces the topic of the meeting and opens the discussion. Consequently it is necessary for the chairman to prepare rather carefully than otherwise his opening remarks in order that the topic may be key-noted correctly.

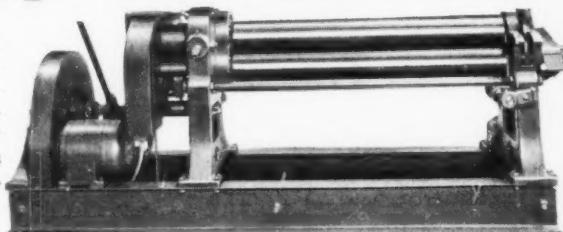
5. Follow-up questions. Similarly, the chairman continues to ask questions during discussion in order to stimulate thought on the question and draw out information from the members. Consequently, it is a good plan for the chairman to prepare in advance a number of follow-up questions more or less in the order in which he plans to use them to keep the ball rolling in the meeting.

6. In eliciting facts and information from his group, the chairman needs to have planned in advance the method of analysis of the facts, whether a "ways-and-means" analysis, cause-and-effect analysis or some other type of analysis will be most effective, prepare his own direct statements, and plan ways to distribute discussion.

7. Within reasonable limits the chairman or conference leader should prepare the summary which he plans to make in the end of the conference. At the time

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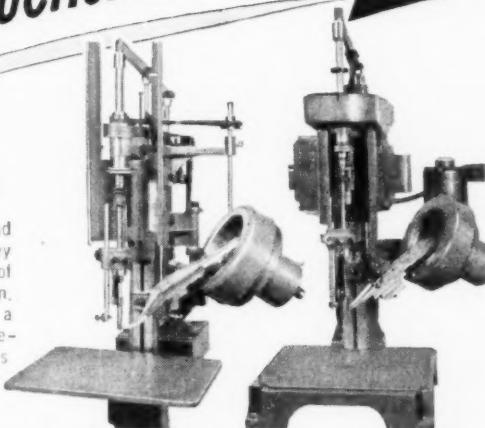
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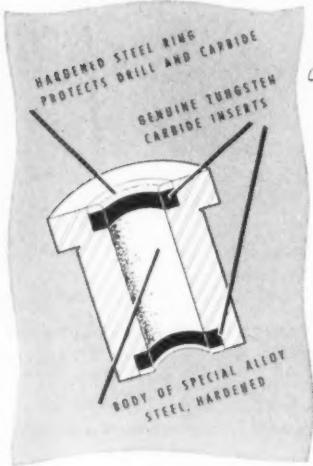
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concisely.

2. The chairman would make such introductory remarks about the subject as would open up the aspect which it was intended to discuss. The leader might explain the subject briefly, outline the scope of items to be considered.

3. The problem of defining terms so that each member of the group knows exactly what they are talking about is the next logical element on the program. Rather than having the conference leader or chairman impose a certain definition upon the group, it is better for him to draw out a definition of the subject and of the terms to be used in discussing it, from the members of the group. Get these definitions from the members of the group at each step to be sure that they all agree just what the terms mean for future use in the discussion.

4. Get discussion under way by developing a body of factual information, opinions, and experiences from the members of the group, either their own experience or the experience of others. The presentation of factual information or cases by the chairman may be effective at the outset of the discussion as a means of stimulating some thought. However, this is primarily of stimulative rather than conclusive value, and wherever possible the entire burden of facts and ideas should be upon the members of the group.

he prepares this summary, it is usually little more than a restatement of the objective of the conference. However, when he actually summarizes the result of the conference, he points out in detail how the various facts and ideas brought out in the discussion lead the group to arrive at the final conclusion.

In actually conducting the conference, the normal order of events followed by the chairman would be more or less as follows:

1. The conference leader would state the subject of the conference clearly and

# NICHOLSON CONTROL VALVES feature EASY MAINTENANCE

A survey of maintenance men shows these 6 reasons for the increasing standardization on Nicholson cylinder control valves:

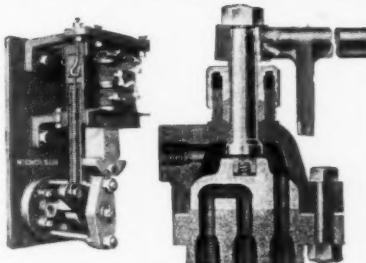
Specially treated hard seats; don't cut out. Seating surfaces protected from dirt, grit. Metals, gaskets and gland packing to suit service.

Generous stuffing box, easily repacked. Heavy-bodied, take abuse. Simplicity of design minimizes maintenance.

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Nicholson standard and special valves in lever, foot, solenoid, motor types; for air, gas, oil, steam, water; size  $\frac{1}{4}$ " to  $2\frac{1}{2}$ ", press. to 5000 lbs.

CATALOG 546.

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- **THEY GO FARTHER**—Because they're stronger, they fasten tighter with fewer screws, give neater appearance with less weight.
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- **THEY COST LESS**—Tighter hold, plus fewer screws, plus a faster fit, means **LOWER COSTS**—in screws as well as production time.

There is a Chicago "Safety Plus" Product designed to give you a tighter, lower cost fastening for **ANY** heavy duty purpose.

FIND THE TYPE YOU NEED  
FROM THIS LIST:

Socket Head Cap Screws • Socket Set Screws • Stripper Bolts • Square Head Dog Point Set Screws • Socket Pipe Plugs • Keys • Hexagon Head Cap Screws, Steel and Brass • Square Head and Headless Cup Point Set Screws • Fillister and Flat Head Cap Screws • Taper Pins • Milled Studs • Semi-Finished Hexagon Nuts, Steel and Brass • Hexagon Castellated Nuts.

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AVAILABLE from STOCK  
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"V" Pulleys



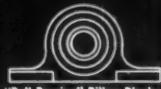
"Step" Pulleys



"Multiple" Pulleys



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"Ball Bearing" Pillow Blocks



"Bronze Bearing" Pillow Blocks



"Babbitt Bearing" Pillow Blocks



"Babbitt" Journal Bearings

**Yes!** — all items illustrated on this page, and many other items not illustrated, are Standard Stock ready for immediate shipment to you. YOU SAVE — TIME . . . MONEY . . . when you use Chicago Stock Parts. No dies to build . . . No stock to carry.

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Manufactured by  
**Chicago DIE CASTING MFG. CO.**

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Chicago 12, Illinois

5. There are various methods of analyzing the information contributed by the members of the group. These include: a **pro-and-con** analysis which develops the advantages and disadvantages of a given procedure together with any suggested remedies or improvements; **cause-and-effect** analysis which points out the occurrence or symptom, the cause, the effect or result of the situation, indicates who was responsible for allowing this situation to continue, and suggests remedies; a **ways-and-means** analysis of developing a solution for a

particular problem or of evolving standard practice in line with the ultimate objective of this particular conference. Other types of analysis used in developing facts and evidence include: a **factor-comparison** method in which factors of similarity and difference are brought out; a responsibility or **line-of-authority** analysis; and a **qualifications** or requirements analysis. All of this material is drawn from the experience of the group. Bear in mind that at this point the group leader should begin to distribute discussion by encouraging the more silent members to talk and by holding down the more talkative participants.

6. The next normal step is the selection of the facts and data to be used by the group in reaching a decision or conclusion. The bulk of the responsibility for selecting these facts rests upon the chairman. Actually, in the case of the chairman who conducts a meeting with a predetermined purpose, this is the stage in the discussion where he can select those facts and opinions which will eventually support his desired idea. If the group is using a secretary, it is her responsibility to see that she records the correct information. It is at this point of selection that the blackboard or easel comes into the greatest use.

7. The evaluation of the facts selected is commonly done by listing them in order of importance and offers a further

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## STONE "SWING-CUT"

- Cut all metals in any size or shape up to 3" solids and 4" pipe with milled-like finish to tolerances of .008. Examples—cut 3" angle iron in 8 seconds, 2" round cold rolled in 7 seconds, 1" tool steel in 5 seconds, 2" steel tubing in 5 seconds. Non-ferrous metals cut at even faster speeds with steel saws.



Cuts any angle from straight to 46° in quick change, self centering vise.

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### Dependable MEASURING & CHECKING EQUIPMENT

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HAND WHEELS, KNOBS, HANDLES

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Non-rusting — good looking



STRAIGHT and OFFSET TYPE



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We also build jigs, fixtures, special tools and machinery. Send us your blueprints.

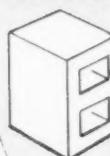
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Over 50 sizes, ranging from 7 x 7 1/2 to 96 x 192.

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DETROIT 12, MICHIGAN

# THAT'S GEAR CUTTING, Packard!

MACHINES USED	ONE SHEAR- SPEED (internal)	ONE SHEAR- SPEED (external)	
		Pressure Plate	Hydr. Piston Plate
Part Produced	Cylinder (housing)	12"	12"
Approx. Pitch Diameter	12"	.976 (2 pcs.)	.562 (2 pcs.)
Length of teeth cut (in.)	1.016	200-240	200-240
Output per hour	85-90	24 secs.	24 secs.
Machine Cycle Time	24 secs.	1/10th that for generating tools	
Estimated Tool Maintenance Cost	***	Approx. 2 hrs. total (complete set-up)	
Change-over time	None Required	Six (8-spindle type)	
Equivalent number of generating machines for same production	12 (single spindle)	0.0004 in. 0.001 in. with any tooth 0.001 in. per inch of tooth	
Maximum Allowable Errors	Involute profile Index Parallel	No tool grinding required in first 5000 pieces produced.	

Ask for  
**BULLETIN 1800-47**

**MICHIGAN TOOL CO.**  
7171 E. McNICHOLS ROAD • DETROIT 12, U.S.A.

opportunity for discussion in arriving at a group decision as to the relative importance of various factors in a situation.

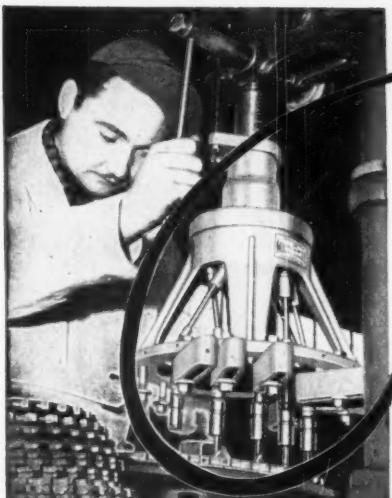
8. Even though there is no group decision in a sense that as a body they vote to act in a certain way, nevertheless the group does in most training conferences arrive at a solution to their hypothetical problem or decide as to the best general policy to adopt on the subject under discussion. It must be remembered that the primary purpose in this conference is educational, to develop

for the conference.

10. The primary values of such a training conference are those of stimulating greater personal alertness among the members of the group, making them more conscious of the problem they were just talking about, and developing among them greater mutual friendship and understanding.

In conducting a training conference there are few rules of procedure required. It should be understood that the members will talk one man at a time

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## MULTI-DRILL

Increases Capacity  
Up to 800%

ADJUSTABLE TO ANY HOLE PATTERN  
FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern — is compactly built to permit easy, unhampered operation with drill rigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as  $\frac{1}{2}$ " — handle drill sizes up to  $\frac{5}{8}$ " in steel. Special adaptations available.

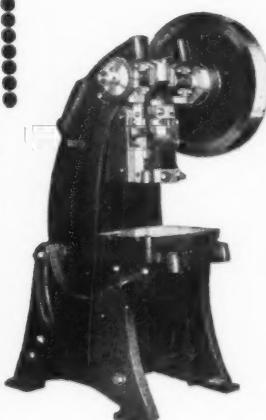
There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

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*Product of Commander — Builder of the Commander Tapper*

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Users report savings up to 50% with quality and accuracy of work markedly improved. Spoilage and overheating both eliminated. IDEAL Live Centers are permanently accurate due to special bearing seal, short overhang and unique bearing arrangement that gives maximum rigidity. Available in all standard sizes. "Multi-Duty" for male, female and pipe-type points. "Heavy-Duty" for big jobs — accurate to .0005"

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Please forward catalog information on Live  
Centers and other production short-cuts.

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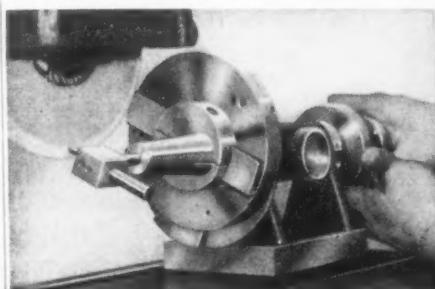
It should be understood that they will be reasonably brief in their comments, and that they will control any sign of temper or undue emotion. It should also be understood that the chairman should be impartial and is acting rather as a servant of the group than as a dictator. THE END

**John L. Goodrow** has been appointed sales manager of the custom molding division of Rogers Plastic Corp., West Warren, Mass.; it has been announced by A. C. Martinelli, president and general manager.

**Milton F. Beecher** was recently elected vice president in charge of research and development at the Norton Co., Worcester 6, Mass., at the 64th annual meeting of company stockholders; directors re-elected **George N. Jeppson** as board chairman and **Milton P. Higgins** as company president.

**E. H. Panczner**, division manager for P. R. Mallory Co., Indianapolis, has joined Paul & Bickman, Inc., Philadelphia, as vice president and works manager.

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Absolute precision with one setting for any two angles, as well as set radius. Especially adapted for angle tangent-to-radius wheel dressing.

95% of all emery wheels in Michigan dressed on Last Word Dresser. For your precision wheel dressing this is the . . . LAST WORD.

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## No Leveling Required

With Anderson Balancing Ways it is easy to balance any rotating object in a fraction of the time formerly required by other methods. Simply place the Ways on the floor or bench and they are ready to use without adjustments of any kind.

The revolving, chilled iron discs and the spindles, are ground and balanced to extreme accuracy. Spindle bushings are hardened—glass hard—yet without danger of breaking. This eliminates the possibility of wear or ball bearing indentations on spindles or bushings when heavy weights are placed on ways. They save time, save labor and assure better work.

Write for Bulletin No. 4-5



Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

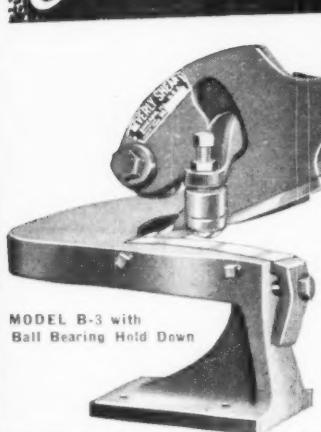


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Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

## Beverly THROATLESS SHEAR

*Cut any Shape... STRAIGHT OR IRREGULAR*



MODEL B-3 with  
Ball Bearing Hold Down

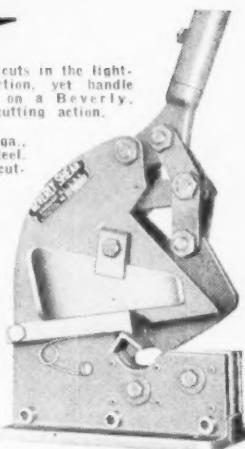
Make straight or intricate cuts in the lightest metals without distortion, yet handle heavier gauges with ease on a Beverly. Smooth, powerful, clean cutting action.

Made in 4 sizes to handle 18 ga.,  
14 ga., 10 ga., and 3 1/8" mild steel.  
H.C.H.C. Blades available for cutting stainless steel.

### NEW WIRE ROPE AND CABLE CUTTER

Cuts wire rope and heavy electrical cable at one stroke. Circular cutting action assures finished cut at one stroke. Snap-Action Hold Down permits instantaneous adjustments for varying sizes. Capacity, wire rope, 11 1/8"; aperture 1". Weight 30 lbs.; base dimensions 8" x 5".

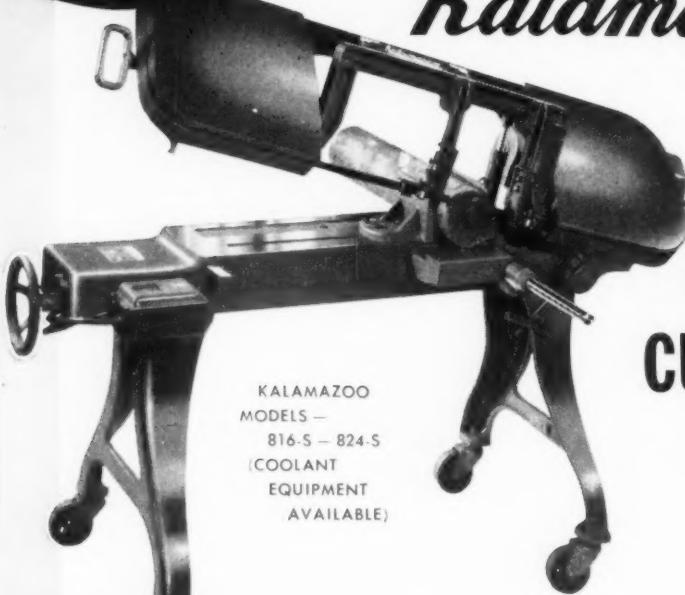
Write for illustrated circulars  
on Beverly Cost Cutting Tools.



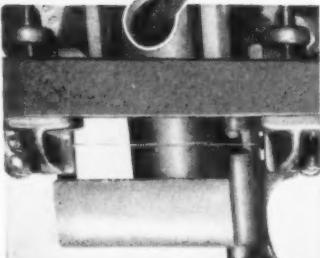
**BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicago 43, Ill.**

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KALAMAZOO  
MODELS —  
816-S — 824-S  
(COOLANT  
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## METAL CUTTING BAND SAW

Only Kalamazoo gives an unobstructed view of cut-off operations! The operator looks directly down into the cut . . . sees for himself how work is progressing, gets instant warning if blade adjustment is needed.

Full work view is one of many exclusive Kalamazoo features giving you faster, smoother, more accurate cutting of angle iron, tubes, bars, pipe. Handles 95% of normal cut-off operations. Leaves no burr, minimum kerf.

Sturdy, rugged, and portable. Has 4 Timken bearings. Blades can be changed in 30 seconds.

Write today for full details on lower-cost metal cutting . . . the Kalamazoo way.

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KALAMAZOO 16, MICHIGAN

# *News of the industry.*

## CINCINNATI PLANER MOVES TO FOND DU LAC

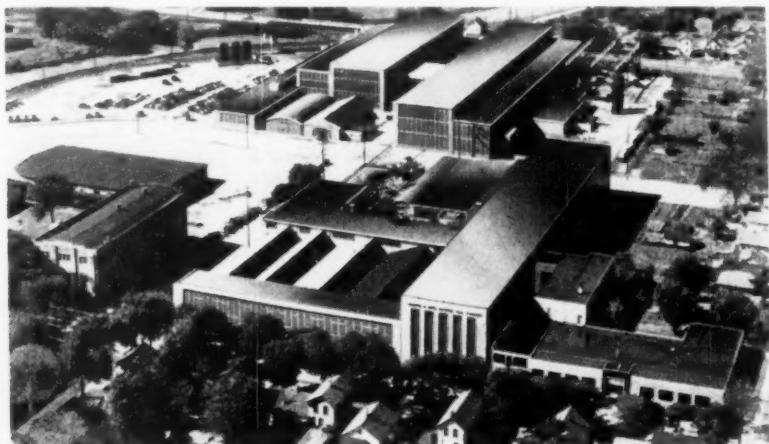
All operations of the Cincinnati Planer Co. now functioning at Cincinnati, O., will be moved to Fond du Lac, Wis., and absorbed by the parent organization, the Giddings & Lewis Machine Tool Co. The move to combine the operations at Fond du Lac was decided for reasons of reducing general operation costs and to provide more extensive engineering and research facilities. It is anticipated that the move will be completed by July 1, 1950.

Mr. R. J. Kraut, president and general manager, emphasized that the Cincinnati Planer Company was in no way being liquidated and plans for moving the com-

plete operation have been so set up as not to jeopardize sales and delivery of the Planer Company products. The complete machine tool line regularly manufactured in Cincinnati will now be built in the new and modern buildings which were especially designed for machine tool manufacturing. These buildings had been recently acquired by the Giddings & Lewis Machine Tool Company.

The Cincinnati Planer Company was purchased by the Giddings & Lewis Machine Tool Company in July 1948. In July of 1949 the sales and engineering departments of the two companies were

*The new home of the Cincinnati Planer Company. The Planer Company was recently purchased by the Giddings & Lewis Machine Tool Co. All operations now functioning at Cincinnati will be moved to the G & L plant.*



consolidated and transferred to Fond du Lac.

There will be no change in the directors and executive officers of the Giddings & Lewis Machine Tool Company.

#### WILLIAMS AND HUSSEY NEW OWNERS O.K. TOOL CO.

Thurston Williams, vice president and treasurer of Williams and Hussey machine company, purchasers in 1949 of the O.K. Tool Company of Shelton, Connecticut, announced today that all manufacturing at Shelton would cease January 27 and henceforth would be conducted at Wilton, N. H.

The tool company, established in 1901, is one of the oldest firms in the metal cutting industry, and will retain its identity and operate as a division of Williams and Hussey machine company, which is exclusively owned and operated under the personal supervision of Thurston Williams and Forrest Hussey. In addition to the modern equipment already available at Wilton, nearly \$200,000 will be invested in new machinery. The O.K. Tool Company was originally organized 49 years ago to manufacture the first tool holders with interchangeable tool bits.

#### DONOVAN ACQUIRES MASTER TOOL CO.

The Donovan Mfg. Co., 80 Battery-march St., Boston, Mass., has acquired all the patents, tradenames, and equipment of the Master Tool Co., Boston, Mass. The "Master" vise, product of the original Master Mfg. Co. will be



Ira F. Nelson

manufactured on the Donovan premises and will continue to be marketed under the "Master" tradename. Distributors for the line of vises is being sought. President of the combined operation is Ira I. Nelson.

The Rice Pump and Machine Co., Milwaukee 15, Wis., formerly a division of

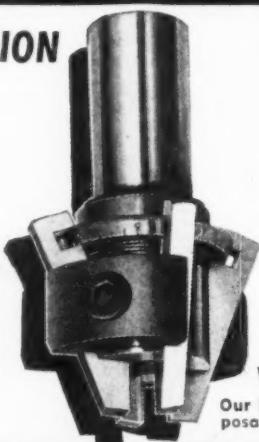
## KUTMORE ADJUSTABLE HOLLOW MILLS

### STEP UP PRODUCTION

THE FINEST TOOL FOR:

- TURNING
- TAPERING
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Combination of Above in  
**ONE PASS**



### ON MULTIPLE OPERATIONS

- Exclusive MICROMETER ADJUSTMENT Feature for Rapid Set Up.
- Blades Quickly Re-Sharpened in COMPLETE SETS.
- Available in High Speed or Carbide Tipped Blades From Stock.

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Our Engineering Dept. is at Your Disposal on Your Hollow Mill Problems.

**CARL WIRTH & SON, INC.**

1625 CLINTON AVE. NO.  
ROCHESTER 5, N. Y.

Milwaukee Chaplet & Mfg. Co., has recently been established as a separate corporation. R. D. Houghton, formerly division manager, has been elected president and treasurer of the new corporation. Erwin Losse, formerly superintendent of the Rice Pump Division, is secretary, while Robert G. Rice, President of Milwaukee Chaplet, is vice president of the new corporation.

Mr. Houghton will serve as General Manager and sales manager of the Rice Pump and Machine Co. and Mr. Losse will be in charge of manufacturing, engineering and product development.

**The Brad Foote Gear Works, Inc.** has purchased the good will of the American Gear and Mfg. Co., 5900 Ogden Avenue, Chicago 50, Ill.

There will be a consolidation of operations contemplating the same personnel to handle orders and inquiries.

#### HY-PRO TOOL NOT FOR SALE

Spiking a rumor that the Hy-Pro Tool Co. of New Bedford, Mass., is for sale, Mr. D. D. Davis, vice-president of the company, states "The Hy-Pro Tool Company, a wholly owned subsidiary of the Continental Screw Company, is not for

sale nor has its sale ever been considered. The vicious rumor circulated among the trade is entirely unfounded and untrue.

**Landis Tool Co., Waynesboro, Penn.**, has announced the acquisition of the outstanding stock of the Gardner Machine Co., Beloit, Wis.

The flat surface grinding machines manufactured by Gardner are not competitive to the cylindrical grinders produced by Landis Tool. All manufacturing operations will continue in Beloit under the same management, and the company will operate as a separate corporation.

Officers of the Gardner Machine Company are M. A. Hollengreen, president; W. B. Leishman, vice president and general manager; C. Winslow Thompson, vice president and assistant general manager; and M. F. Frantz, treasurer.

**The Pittsburgh Tool Steel Wire Co.** of Monaca, Penn., has acquired the Washington Precision Grinding Co., Washington, Penn., producers of precision ground tool steel flat and square sections. This product complements the line of drill rods and other cold finished fine steels produced by Pittsburgh Tool Steel Wire Company. The machinery and equipment

## TAP NO. 2-56 TO 3/8" IN STEEL

### With only 1 DORMAN TAPPER

#### \* Automatic Reverse and Torque Control

- ... one minute to adjust
- ... prevents tap breakage
- ... no controlled pressure required
- ... operator need not be skilled

#### \* Four Sizes of Dorman Tappers — Tap Capacity No. 2-56 to 2" in Steel

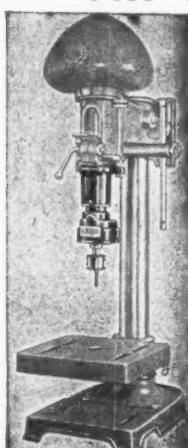
- Note wide tap range in each size.
- No. 1 Friction Drive Tapper—capacity No. 2-56 to  $\frac{3}{8}$ " in Steel and  $\frac{1}{2}$ " in Aluminum.
- No. 2B Positive Tapper—capacity  $\frac{3}{8}$ " to  $\frac{7}{8}$ " in Steel.
- No. 3A Positive Tapper—capacity  $\frac{1}{2}$ " to  $1\frac{1}{4}$ " in Steel,  $\frac{1}{2}$ " to  $\frac{3}{4}$ " pipe taps.
- No. 4A Tapper—capacity  $\frac{3}{4}$ " to 2" in Steel including pipe taps.

#### \* Efficient Production Threaders with

- Round Split ... Button ... Acorn Dies

#### \* Immediate Delivery      \* Low Priced ... from \$44.00

\* Write today for descriptive literature.



### THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1030 N. PLUM ST., LANCASTER, PA.

#### Other Products

Universal Adjustable Drillheads

Standard— $\frac{1}{2}$ " Minimum—Centers to  $10\frac{1}{2}$ " Diameter Circle

Special Fixed Center & Gear Driven Adjustable Drillheads

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EFFICIENT  
TOOL DESIGNING**

*means  
better production  
at a lower cost*

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools — designed for economy of operation, resulting in your increased production at lower costs.

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*and Machine Co.*

930 CLEVELAND AVE., COLUMBUS 0 OHIO

**FOR**  
*Cost Reduction*

Snow Air-operated, Electrically Controlled Machines and Fixtures  
• Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

**Write for details**

# SNOW

SNOW MANUFACTURING COMPANY  
435 Eastern Ave. • Bellwood, Illinois  
(Chicago suburb)

have been removed to the main plant at Monaca and operations are being continued at Monaca.

**LOVE MACHINE AND TOOL ACQUIRES  
MERZ**

The physical assets and inventory of the Merz Engineering Co., Indianapolis, Ind., have been purchased by Miklos Sperling of the Love Machine and Tool Co. of this city. Mr. Sperling took possession as of April 1, 1950, and will operate under the name of Merz Engineering, Inc.

Mr. Sperling will move such equipment as is necessary for the successful manufacture of tools, dies, jigs and fixtures and their related products, to the Merz location. The Love Machine and Tool Company is nationally known as manufacturers of dies, jigs and fixtures, while Merz is recognized as producers of standard and special gages, precision aircraft products, experimental work, special machinery, air and electronic gages for measuring and automatic air and electronic measuring and sorting machines. Officials are: Miklos Sperling, president; Katharine Roessner, Secretary-Treasurer; Earl J. Breech, V. P. in charge of sales; Chester D. Schuman, chief engineer; Troy A. Wiley, works manager.

**CURTIS UNIVERSAL CHANGES  
SALES POLICIES . . .**

Ralph E. Curtis, President and Treasurer of Curtis Universal, has just announced a drastic change in sales policy.

This policy change now enables any user of industrial universal joints to order direct from Curtis, thereby getting faster delivery from complete factory stocks, plus any additional technical advice as to the right joint for the job. It also enables a customer to specify special hub borings, or machining, so as to be sure joints are ready to install immediately, with no chance of spoilage in the machining.

**AN EXCLUSIVE TOPFLIGHT ITEM**

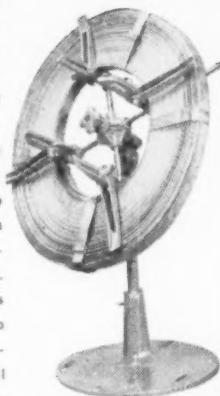
# TOPFLEX

Made to methods engineers' specifications - for industrial use. Rugged pressure sensitive tape, printed to your order

**TOPFLIGHT TAPE CO. - YORK, PA.**

## QUICK-LOADING STOCK REELS

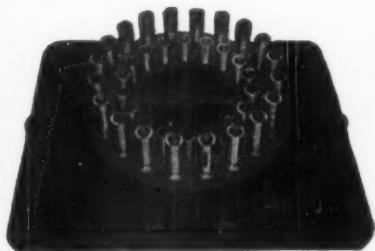
The S and S stock reels with quick loading arms are designed for the economical handling of stock from coils. Constructed with a snap lock knuckle joint for loading. These reels may be set in any plane from vertical to horizontal. Double swivel reels are manufactured so that loading is possible while other spool is reeling out stock.



Dial And Roll Feeds For Presses



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Pictured: a 38-Spindle Heavy-Duty Drill Head.

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On tapping and reaming jobs, you'll find it much easier to make accurate set-ups with the Ziegler Tool Holder for one simple reason. The Ziegler automatically corrects inaccuracies up to 1/32" radius or 1/16" diameter.

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DRIVE

FLOATING HOLDER  
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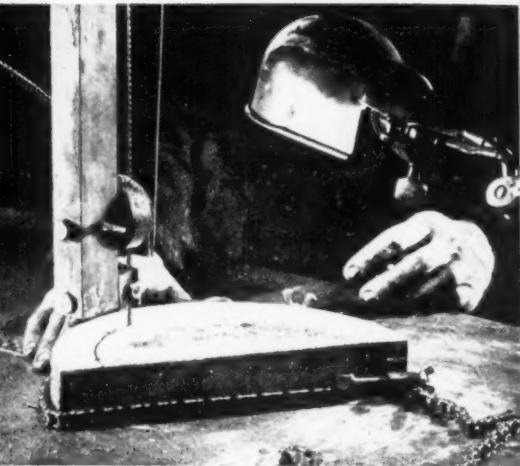
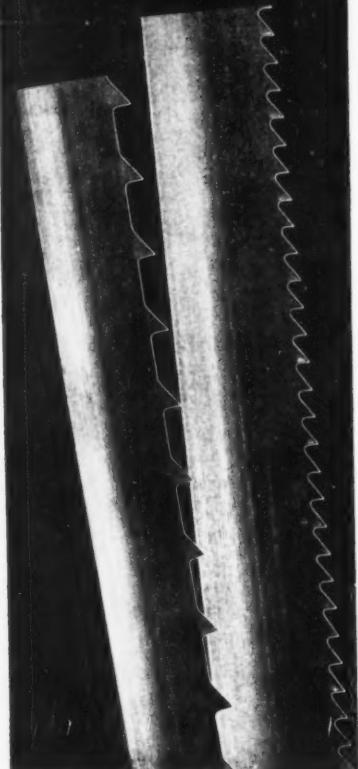
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# *Available Literature*

CATALOGS, BOOKS AND  
INDUSTRIAL FILMS . . . . .

**1. Citeo Hydraulic Diamond Turner** aids in cutting diamond and grinding costs; it can step up production rate and increase efficiency; the device is adjustable to three ranges of degrees. Automatic control splits the segments at the completion of each turning cycle. New illustrated brochure demonstrates fully advantages of this device. Free copy on request to **Cleveland Industrial Tool Corp., 1080 E. 22nd St., Cleveland 17, O.**

\* \* \* \*

**2. Cushman Rotating Air Cylinders** developed to meet the requirements of advanced machine tool applications and to assure trouble-free service under speed and load conditions where previous designs have proved inadequate. Specifications, diagrams in 4-page Bulletin No. PO-7-1949 available from **The Cushman Chuck Co., Hartford 2, Conn.**

\* \* \* \*

**3. Bryant External Thread Gage** checks accumulated error of thread elements; its quantitative reading method gives indication of fit. These comparator gages are designed in three ranges, covering work up to 5". They are described in detail in new 4-page bulletin, with photographs and specifications, available from **Bryant Chucking Grinder Co., Springfield, Vt.**

\* \* \* \*

**4. Reishauer ZA Tooth Flank Gear Grinding Machine** grinds gears to very close tolerances at a high speed. High production capacity with extreme accuracy is stressed. The generating principle of grinding, the method of operation and machine specifications are described in 4-page illustrated folder available upon request to **Cosa Corporation, 405 Lexington Ave., Chrysler Bldg., New York 17, N. Y.**

**5. Engineering For Production;** lecture delivered at the semi-annual meeting of the A.S.M.E. in June 1949 by Carl M. Beach, assistant sales manager of Cincinnati Milling and Grinding Machines. The subject is still a timely one, since the theme of cost reduction is woven throughout the text of the lecture. Reprints available in attractive 8-page, illustrated brochure. Write for Publication No. M-1705 to **The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

\* \* \* \*

**6. The Shear Knife Handbook,** a 48-page, 4 $\frac{1}{2}$ " x 7 $\frac{1}{4}$ " glossary of useful information for those who specify, use, buy or grind metal-cutting shear knives. Recommendations for selecting the proper grade knife for the cutting operation to be done, tips to facilitate inquiries and the handling of orders are included. Well illustrated and supplied with conversion tables, charts to calculate coil weight, etc. Available without cost from **Heppenstall Co., 4620 Hatfield St., Pittsburgh 1, Pa.**

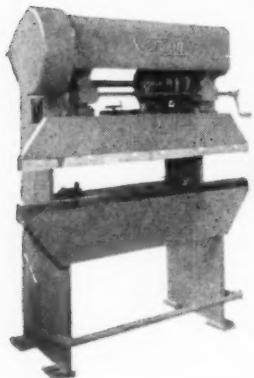
\* \* \* \*

**7. "Nirol" Live Center** constructed with a heavy, powerful spring which compensates automatically for work expansion due to heating, and avoids the continual resetting of the tailstock. Minute overhang eliminates vibration and chatter. Rotating center runs true within .0002" accuracy. Described in illustrated specification sheet available from **L. F. Treichler, Precision Grinding, 900 Route 29, North Plainfield, N. J.**

\* \* \* \*

**8. "Unlimited Applications,"** attractive 2-color, 20-page booklet, describing the Delta Multiplex, new wood-working machine just introduced by the Power Tool Division of Rockwell Mfg. Co. Complete

# Slash metal forming costs...



Shops that are wasting manpower with hand brakes or tying up big machines with small odd jobs have the answer to their problems in the new Verson 16-48 Press Brake. Compact and low in cost, the 16-48 brings the advantages of power operation and big brake design to smaller shops. Bed and ram length is 48". Capacity ranges from a 48" length of 16 ga. steel to a 24" length of 10 ga. steel. Allsteel construction assures perfect alignment and maximum rigidity. Write for a copy of Bulletin 16-48A; it gives complete design details, specifications and capacities.

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descriptions, over 60 illustrations, showing various phases of the unit's adaptability; also describes four Delta Multiplex models and line of accessories. Ask for Bulletin AD-564. Power Tool Division, Rockwell Manufacturing Co., Milwaukee 1, Wis.

\* \* \*

9. South Bend Light Ten Lathes illustrated and described in 8-page, 8½" x 11" Catalog No. L-10, just released. Complete specifications and prices of this precision machine tool are included, as well

dimensional information included. Bulletin R-3. Rimat Machine Tool Co., 1117 Air Way, Glendale 1, Calif.

\* \* \*

12. Self-Locking Rings require no groove for installation or assembly. Rings are described as economical to use and easy to assemble; recommended for use on shafts and in housings where conditions of impact and vibration are not excessive. Described in 4-page Bulletin No. 5, giving complete engineering data, specifications and typical applications. Truare Sales Division, Waldes Kohinoor, Inc..

as attachments and accessories. Copies of Catalog L-10 will be mailed on request to South Bend Lathe Works, 426A E. Madison St., South Bend 22, Ind.

\* \* \*

10. Lindberg LI-10 Induction Heating Unit, a heavy duty, vacuum tube converter, designed for dependable, continuous performance; the unit will supply 10 kw. at 425,000 cycles per second. Can be used in many metal heat treating and fabrication operations. Described in detail in Bulletin T-1430. Lindberg Engineering Co., 2442 W. Hubbard St., Chicago 12, Ill.

\* \* \*

11. Rimat Inside Micrometers for accurate measurements of large, small and deep bores, snap ring and "O" ring grooves; described in detail in new 4-page bulletin just off the press. In larger sizes, one instrument will measure a greater variety of dimensions than heretofore; complete di-

## How would you tool up — to machine **59 different parts** in short runs?

Warner & Swasey Company—on parts for its textile machines—did it very simply. The tooling consists essentially of

**ONE Colonial Pull-down broaching machine, plus**

**THREE base fixtures, plus fixture adapters . . .**

. . . all designed and built by Colonial Broach Company, Detroit. Net result:

High precision, fast metal removal, reasonable tooling cost, low change-over cost. For the complete story, ask for Broaching News, Vol. XI, No. 2.



47-16 Austel Place, Long Island City 1, N. Y.

13. **Safco No. 1250 Hi-Temp Oil**, developed to meet a serious demand for a new lubricant for ball and roller bearings and journal bearings, which are constantly subjected to severe operating temperatures. Product Data Sheet No. 1-IL, giving complete description available upon request to **Swan-Finch Oil Corp.**, 30 Rockefeller Plaza, New York 20, N. Y.

14. **Carbide Tipped Tools**, a handsome 28-page catalog just issued by Whitman & Barnes, lists and illustrates Taper Shank

Drills, Jobbers', Wire Gage and Letter Size Drills, Glass and Core Drills, Lathe Centers, a variety of Reamers and Countersinks. The use and care of these tools as well as grinding information is included. Catalog No. 104 is available upon request to **Whitman & Barnes, 40600 Plymouth Road, Plymouth, Mich.**

15. **"Folded and Formed" Heating Elements** are now guaranteed for five years at temperatures up to either 750 F. or 1350 F. They are made of Driver-Harris top grade nickel chromium ribbon, folded and formed by Trent, Inc., into its unique shape. Have a basic unit design of 12" square. Have wide industrial applications wherever containers, tanks etc. are used. Complete construction details available in 4-page Bulletin No. 80-T. **Trent, Inc., Leverington Ave. and Wilde St., Philadelphia 27, Pa.**

16. **Spectrum Diamond Lapping Compound**, a dependable, fast cutting pure diamond abrasive for micro-finishing, precision lapping of mirror finishes on plastic and glass moulds, gauges, optical flats, carbide dies, cutting tools, etc. Described and illustrated in 4-page Bulletin available upon request. **Penn Scientific Products Co., 5941 Alma St., Philadelphia 24, Pa.**

17. **Dyclone Dust Collectors** for industrial dust recovery are described in a 12-page catalog giving complete diagrams, applications and descriptions of various

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P-400

For clamping when space is limited

Equipped with various spindle types—steel or copper, or rubber capped

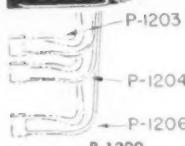


FGP-400

Spindle automatically adjusts itself to total thickness of materials held



P-1203



P-1204



P-1206



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Available in 4 standard throat gaps— $1\frac{1}{2}$ ",  $2\frac{1}{4}$ ",  $3\frac{1}{2}$ " and 6"

Whether you clamp tiny parts requiring pressures of a few pounds or want to hold together huge assemblies that need pressures of around 1800 pounds, Knu-Vise Toggle-action pliers will provide the dependable service you need.

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Glendale, Calif., Art Lewis Prod. Equip. Co.  
Houston, Texas, L. H. Creasy  
Indianapolis, Indiana, E. M. Lewis  
Kansas City, Kansas, L. N. Wood  
Milwaukee 9, Wisconsin, K. W. Stoffregen  
New York 17, New York, V. A. Chern  
Oakland, Calif., Bues Prod. Equip. Co.  
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**Western Division, 422 Magnolia St., Glendale, Calif.**

types of Ducon dust collecting equipment. Write for Catalog No. DC-49 to **The Ducon Company, 148 E. Second St., Mineola, N. Y.**

**18. All-Flex Swivel Pipe Couplings** described in new catalog giving design features, specifications, working pressures and prices of complete line of high and low-pressure All-Flex ball bearing couplings. Eight basic styles in sizes from  $\frac{3}{8}$ " to 12" and for pressures from vacuum to 12,000 p.s.i. Catalog No. 50. **Gil-Lair Products, Inc., 81 Masonic Court, Pasadena, Calif.**

contains useful information on testing machines; a complete selection of units which meet A.S.T.M., Federal, Army and Navy specifications is included in this 4-page bulletin. Specifications and illustrations of hand and motor driven models. New Bulletin No. 41 available. **Tinius Olsen Testing Machine Co., Maple Ave., Willow Grove, Pa.**

**22. Reversible Grinder Machine Dog**, a new drop forge steel device which is applicable to all cylindrical grinding machines. The dog has many advantages including perfect balance, a reversible

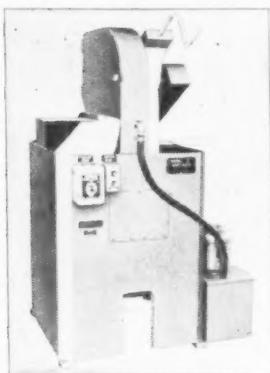
**19. P & W 15-inch Precision Level**, described as the "foundation of accurate machine performance"; illustrated with detailed photographs and applications in attractive 4-page Circular No. 472-1. **Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn.**

**20. Heat Treated Alloy Steels**, a new Ryerson bulletin, gives engineering data on two high performance alloy steels supplied in the heat treated condition, ready to use. Sold under the trade names of Ryecrome and Nikrome "M", these heat treated steels are suitable for heavy duty axles and shafts, gears, pinions, studs and bolts, etc. Data tables include mechanical properties, test results, etc. Copy sent on request to **Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.**

**21. Production Testing Quality Control Instruction**

# ABRASIVE CUTTING ..

**Wet or Dry with this low-priced machine**



**The Model 15 Campbell Abrasive Cutting Machine**  
will cut solid bar stock and tubing economically. Material may be steel of any analysis—annealed or unannealed—brass, monel, ceramic or phenolic plastic.

**Wet model** makes extremely smooth, clean cuts to a tolerance of a few thousandths—with little or no burr or burn.

Through manufacturing economies, this machine can be produced and sold at an attractively low price compared with previous comparable models.

For detailed information, write for Bulletin DH-102-C.

## CAMPBELL MACHINE DIVISION

American Chain & Cable  
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jaw, adjustable screws and nuts, etc. It is described in new 4-page, 2-color bulletin which will be sent upon request to **The Ready Tool Co., 550 Iranistan Ave., Bridgeport 5, Conn.**

**23. Price Lists Available** on Cutters, Vises, Mills, Taps, Reamers, Drills, Chucks. All types of Gages, including Cylindrical Plug, Cylindrical Ring, Snap, Pipe Thread, Roll Thread, etc. Adjustable Reamers, Diamond Point Emery Wheel Dressers and hundreds of other items. **Victor Machinery Exchange, 251 Centre St., New York, N. Y.**

**24. Motors and Generators:** a new bulletin has recently been issued describing the performance and construction of Janette units. Copies of this 4-page, illustrated Bulletin No. 15-1 may be obtained by writing **Janette Manufacturing Co., 566 W. Monroe St., Chicago 6, Ill.**

**25. Mechanical Tubing** — methods in which increased production, lower manufacturing costs and short cuts to improved design may be reached by taking advantage of a service embracing the complete range of steel tubing available to industry. This includes seamless, as well as welded, tubing, hot-finished or hot-rolled, cold-drawn or cold-rolled, in carbon, alloy and stainless steel grades, in various finishes, and heat treated. Bulletin TB-324 available on request to **The Babcock & Wilcox Tube Co., Beaver Falls, Pa.**

**26. Gerotor Air Cylinders** illustrated and described in new 16-page, two-color, 8½" x 11" catalog designed to help the engineer lay out his air circuit. Drawings and tables are furnished for each model and size cylinder showing complete detailed dimensions. Seven types of cylinder mountings are described; types and model valves most suited to various applications also recommended. Request Catalog Section No. 54. **Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass.**

**27. Barrett Elevators and Cranes** — described in new edition of 36-page presen-

# ALL NEW 'JA' FLOATING HOLDER

by  SCULLY-JONES

It's New And Different.

A double gear spline drive coupling (unique in floating holder field) is used to give unrestricted parallel and angular float. Flexible couplings based on this mechanical principle have been in successful operation for many years in the power transmission field; to correct misalignment between shafts.

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Reduce rejects, increase production and profits by using the All New 'JA' Floating Holder for your tapping operations.

#### Reams To Close Tolerances

Because of free float in all directions, under all conditions you are assured of reamed holes being held to close tolerances.

#### Works On Close Centers

The small diameter of this new floating holder makes it ideal for close center and multiple spindle work.

#### Gives Trouble Free Operation

Wear on the floating elements in this new floating holder is practically eliminated, due to the positive lubrication of all parts and the large contact area of the coupling elements. This means long life and low maintenance costs.

*The All New Scully-Jones 'JA' Floating Holder is available from stock in three sizes with Morse Taper shanks and holes.*

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containing prices and specifications.

You Get Low Cost, Fast, Accurate Production With Our Standard And Special Tools

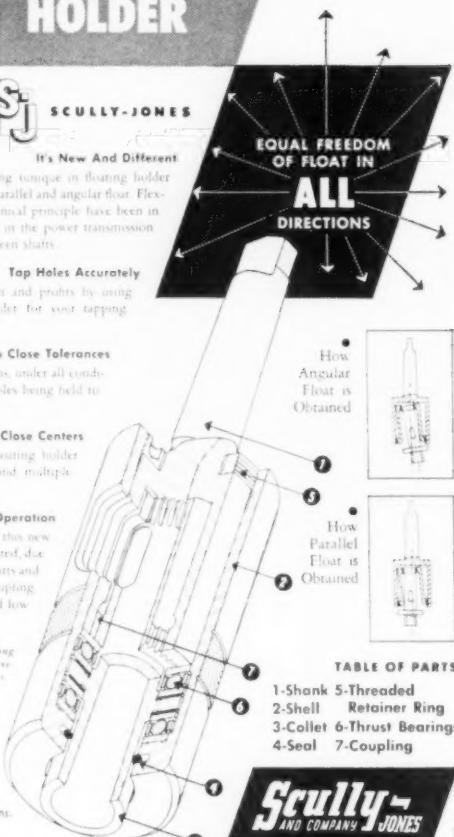


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- 1-Shank 5-Threaded
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- 4-Seal 7-Coupling

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tation, now revised to include the recently developed "Hundred Line" of portable elevators available in three standard models of 500, 1000 and 2000-lbs. capacity. Bulletin also presents entire Barrett line of elevators; hand operated types, electric operated portable types, hand and electric telescopic portable types, etc., with complete characteristics. Request Bulletin 4951. **Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Ill.**

\* \* \*

28. "All-Tool" Collet Index Fixture with center attachment and rotary grinding feature, a newly invented device said to

stress cost reduction, since its combination of features eliminates special set-ups, thus assuring more accurate work. The unit is made to fit a No. 2 Surface Grinder. Completely described in new 4-page bulletin available upon request. **Eastern Machine & Tool Co., 170 Broadway, New York 7, N. Y.**

\* \* \*

29. **Ingersoll - Rand X L E Compressors**

described in new three-color, 18-page brochure. These new - design air compressors are of the heavy-duty, double - acting, cross-head type, water-cooled, built for high efficiency. Completely described and illustrated with photographs, cutaway diagrams and specifications. Form No. 3150 will be sent upon request to **Ingersoll - Rand Co., 11 Broadway, New York 4, N. Y.**

\* \* \*

30. **Cost-Cutting or 25 Chucking Machine Jobs**, an attractive 32-page manual giving a picture-story

analysis of actual production jobs performed on Acme-Gridley 4, 6, and 8-spindle Chucking Automatics. Savings made on these machines are graphically presented, stressing increased number of operations available, accessibility for set-up, sustained accuracy at faster output and fewer machines required. Bulletin No. CM-44 sent upon request to **The National-Acme Co., 170 E. 131st St., Cleveland 8, Ohio.**

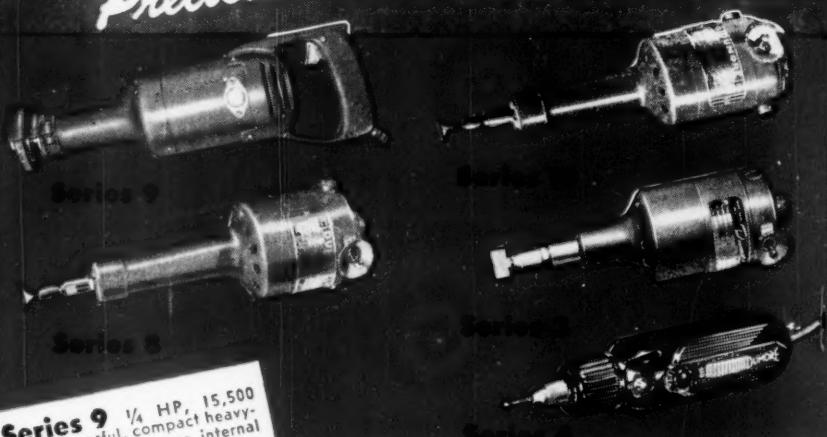
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31. **Improved Seals Liqui-jector** utilized in precision pneumatic operations which require positive conditioning of air or

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*High-Speed Precision*

## HANDGRINDERS



**Series 9** 1/4 HP, 15,500 RPM. Powerful, compact heavy-duty grinder for large internal and external work.

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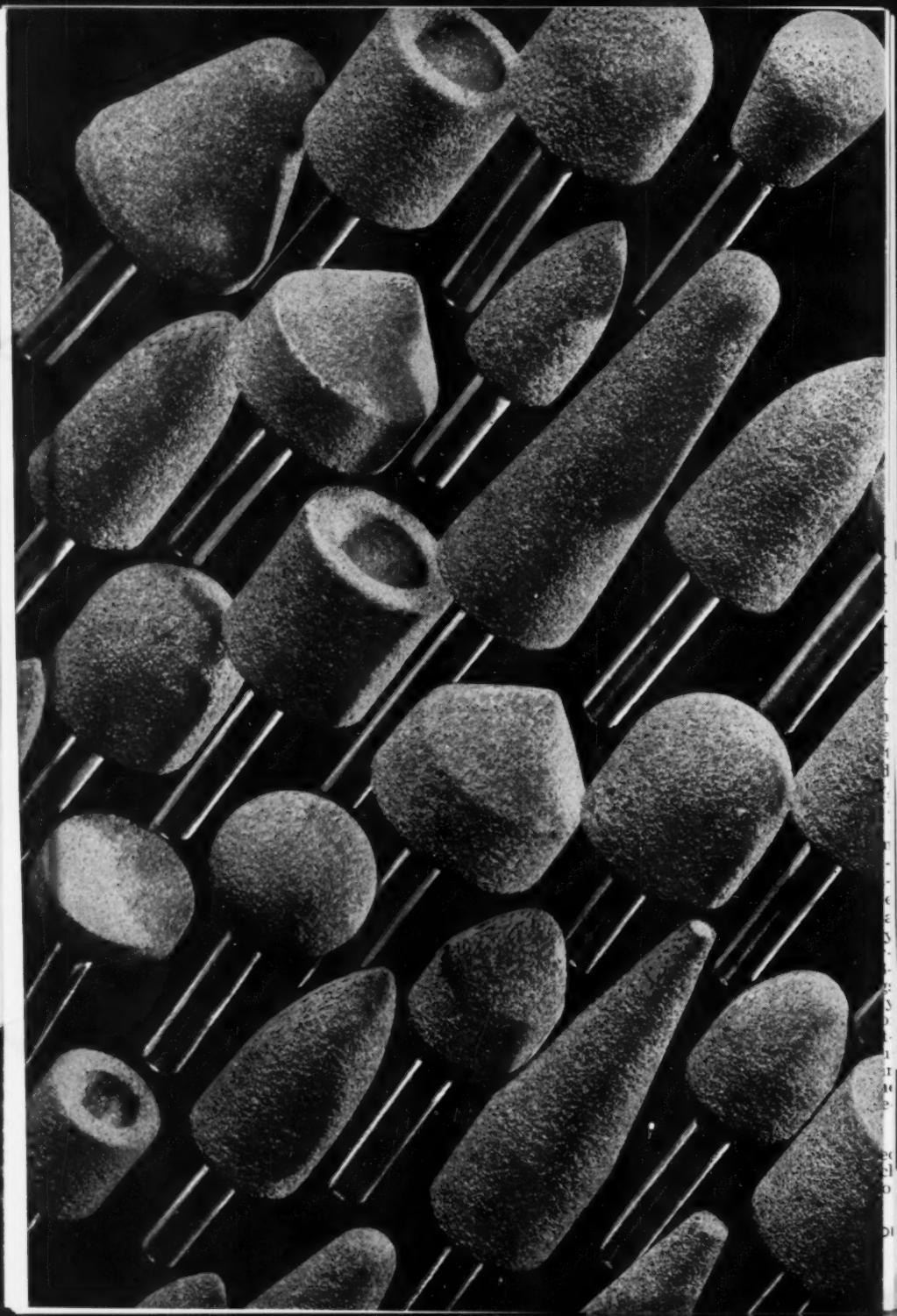
Now you can standardize on one line of high-speed handgrinders for your shop. No matter what your requirements, *price-wise* or *performance-wise*, there's a precision-built Dumore to fit your needs. You save money because Dumore handgrinders are longer lived . . . require less maintenance . . . stand up under production abuse, yet provide the smooth, vibrationless operation necessary for efficient work. Let us show you, in your own shop, why shopmen swear by — not at Dumores. Write Dept. E-27



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**Those** little wheels are the result of more than 50 years of know-how and more than 1001 tests to determine the most exactly perfect combination of grain, grade, bond, shape, shank length and steel analysis to do each job.



## FREE ENGINEERING SERVICE

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# L-W $\frac{110}{120}$ V. MAGNETIC CHUCKS

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**Guaranteed Waterproof**

$5\frac{3}{4}'' \times 13''$

**\$47.65**

$6\frac{1}{2}'' \times 18''$

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$8'' \times 24''$

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$10\frac{1}{4}'' \times 37''$

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A single pass over the stationary poles completely demagnetizes work. 110 volt A.C. Model B-2 for large work,  $7\frac{3}{4}'' \times 12\frac{1}{2}'' \times 6\frac{1}{4}''$ .  
Ship. wt. 55 lbs.

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A.C. input 110 volts. D.C. output 110 volts. P-1 for  $5\frac{3}{4}'' \times 13''$  chuck 0.8 amps.

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P-3 for  $8'' \times 24''$ ,  $10\frac{1}{4}'' \times 37''$  chuck 3.0 amps.

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For  $5\frac{3}{4}'' \times 13''$  and  $6\frac{1}{2}'' \times 18''$  sizes

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Field discharge type for  $8'' \times 24''$  and  $10\frac{1}{4}'' \times 37''$

**\$16.25**

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



**L-W CHUCK COMPANY**

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gas. Typical applications are in liquid separation, agitation, drying, spraying, instruments and pneumatic mechanisms. Described in detail in new Bulletin SC-10-1, available upon request to Selas Corporation of America, Philadelphia 34, Pa.

\* \* \*

32. **Magnetic Coolant Separators** described in 16-page bulletin, well illustrated with photographs, diagrams and complete specifications. Units stress keeping coolant in consistently clean condition, an important consideration where extreme accuracy in machining operations is a requisite. New Bulletin No. 300-A available upon request to Barnes Drill Co., 814-830 Chestnut St., Rockford, Ill.

\* \* \*

33. **Painting with Aluminum**, a comprehensive, 32-page brochure for industrial users of aluminum paint, just issued by Alcoa. Uses of aluminum paint divided into three classifications: for metal, concrete and masonry; for weather-exposed wood; for interior heated surfaces. Well-illustrated, contains much useful information. Request Form No. AD-228. Aluminum Company of America, 801 Gulf Bldg., Pittsburgh 19, Pa.

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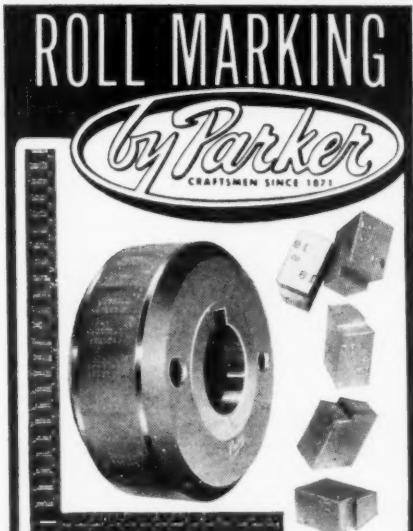
34. **Allis-Chalmers 1949 Annual Review**, an attractive, well-illustrated, 44-page brochure gives interesting over-all summaries of A-C products and new installations, including power generation and distribution, public works, metal, coal, rock products, petroleum, forest products, general industrial, export, etc. Copies are available upon request to Allis-Chalmers Manufacturing Co., Box 512, Milwaukee 1, Wisconsin.

\* \* \*

35. "Our Story in Pictures" is the title of a 16-page, two-color booklet issued by the American Non-Gran Bronze Co., describing and fully illustrating the contract manufacturing facilities of this firm for precision machine work, bronze and centrifugal castings and Non-Gran bronze products. Production problems solved by the firm are outlined. Copies upon request to American Non-Gran Bronze Co., Berwyn, Pa.

\* \* \*

36. **Slitting Lines for Coils and Sheets**, a new 76-page book just issued by The Yoder Co., traces the evolution of multiple rotary slitters and explains basic considerations in selection of equipment. Tables of production records show influence of slitting speed; coil sizes, number of strands slit, and coil handling equipment. Fully illustrated, with much



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Hartford, Conn.



CRAFTSMEN SINCE 1871

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You can depend on Acme for Tools that will meet your Shop and Inspection Requirements for measuring Flats, Angles or Heights. These measuring tools are made of MEEHANITE METAL and are available in many types and sizes:

Surface Plates - Box Parallels  
Slotted Angle Plates  
Universal Right Angles  
Flat Parallels - Lapping Plates  
Toolmakers' Knees - Straight Edges  
Masterangle Plates - Angle Attachments

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WE RESCRAPE SURFACE PLATES  
LIKE NEW

**ACME TOOL CO.**  
11 W. Broadway      New York 7, N. Y.

pertinent information on production rates, general data on operating costs, simplification of inventories, etc. Copies on request to **The Yoder Co., Dept. 5509, 5509 Walworth Ave., Cleveland 2, Ohio**

\* \* \*

**37. Improving Quality and Reducing Cost**, a new 34-page catalog issued by the Dow Mechanical Corp., explains in detail their system of simplified dimensional control for the gauging of accurately machined parts for 1 1/16" to 5" in diameter. Pictures cover Dow Gages now in use by manufacturers of guns, diesel equipment, aircraft engines, instruments, screw products, etc. Catalog free upon request to **The Dow Mechanical Corp., Thompsonville, Conn.**

\* \* \*

**38. Kanti-Lever Flexible Couplings** used as a resilient medium for absorbing shocks and vibration; summarized in 8-page, illustrated bulletin giving construction features, dimensions, specifications of standard and special purpose units; contains useful information of interest to maintenance departments. Bulletin No. 28 will be sent upon request to **Brown Engineering Co., 126 N. Third St., Reading, Pennsylvania.**

\* \* \*

**39. "The Working of Tool and High Speed Steels."** 16-page booklet containing technical data certified by the metallurgical staff of Allegheny-Ludlum Steel Corp. Specific information summarized from laboratory and service tests on various grades of A-L steel. Data on design, machining, cutting-tool angles, speeds, heat treatment, grinding. Copies on request from **Allegheny-Ludlum Steel Corp., Room 2036, Henry W. Oliver Bldg., Pittsburgh 22, Pa.**

\* \* \*

**40. Precision Micrometers**, with hardened, ground and lapped lead screw, illustrated and described in 8-page, 2-color catalog, available upon request from **Swedish Gage Co. of America, 8900 Alpine Ave., Detroit 4, Mich.**

## FILES, FILES, FILES

Answers to Quiz from Page 268.

1. Part that fits into handle
2. Flat
3. Larger
4. Both sides curved
5. 22
6. 120
7. 160-200
8. Slightly curved
9. Coarse single cut
10. First series of teeth cut on file.

# CUT 100 KEYWAYS

in gears, milling  
cutters, pulley hubs,  
collars, couplings, etc.

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the cost of a  
*Minute Man®* Broach and Bushing



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for keyways from  $\frac{1}{16}$ " to  $\frac{3}{4}$ "  
wide, in bores from  $\frac{1}{4}$ " to  
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Company \_\_\_\_\_

Address \_\_\_\_\_

## New Films

### BIG BOY, THE WORLD'S LARGEST BROACH

Detroit Broach Company  
Detroit 34, Michigan  
22 minutes. 16 mm. sound film in full color.  
Obtainable to any interested group without  
charge from Detroit Broach Co., 20201 Sher-  
wood Ave., Detroit 34, Mich.

This recently released film starring  
"Big Boy," the world's largest broach,  
has caused considerable comment and  
interest wherever it has been shown.

The picture was produced through the cooperation of Detroit Broach Co., Commercial Steel Treating Corp., Eaton Machinery Co., and Universal-Cyclops Steel Corp.

The film traces the life of the giant broach from the pouring of the steel for its forging through actual production use. Being in full color, the film vividly illustrates the spectacular steel mill and heat treating operations.

"Big Boy" is an involute spline broach measuring 84-3/4" long, 9-3/16" in diameter, and weighs over  $\frac{1}{4}$  ton when finished. The cutting section of this mammoth tool was produced from what is reported to be the largest high speed steel forging ever produced. The forging is B-6-1841 high speed steel, and weighed 1571 lbs. when delivered to Detroit Broach for processing.

The section of the film covering "Big Boy" in production use is particularly unusual,

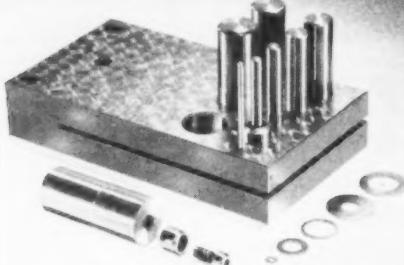
since the broach removes 21/4 lbs. of steel on every stroke. "Big Boy" was designed and built by Detroit Broach to produce the 44-tooth involute spline in bevel drive gears for an Eaton two-speed truck axle.

The great economies which this giant tool permits are graphically illustrated in the film; it has cut tool costs for Eaton by 1/3, has cut maintenance costs 11/12ths, and has reduced production time 63/64ths.

Freight traffic produces more than 82 cents of every dollar of revenue the railroads take in.

## MAKE WASHERS AND SHIMS

Up to  $\frac{1}{8}$ " Thickness  
IN STEEL—PLASTIC—MICA—RUBBER—ETC.



When Ordering Specify 1/16 or 1/8 Graduation

This handy shim and washer die set pierces the thinnest of shim stock or up to 1/16" through mild steel, without burring. Punch sizes are  $\frac{1}{16}$ " to 1" in  $\frac{1}{16}$ " or  $\frac{1}{8}$ " graduations. 28 washer combinations. Made of high grade tool steel hardened and drawn to withstand shock without breakage.

\$39.50 per set. Write for complete specifications. Finished Wooden Case \$4.75 extra.

**DAVIS & LARRICK MFG. CO.**  
Box 191, Route No. 2 Dayton 10, Ohio

## Appointments & Promotions

**Bernard M. Costello** was named vice president—manufacturing, and **William E. Ireland**, vice president—sales, of the International B. F. Goodrich Company, effective December 1, it was announced by W. C. Gulick, president. The company is the foreign trade division of The B. F. Goodrich Company, Akron, Ohio.



William E. Ireland



Bernard M. Costello

• • •

R. L. Sylvester, vice president and general manager, Rollins Engine & Machinery Co., Nashua, N. H., has announced appointment of **Charles I. Geddes** as sales engineer.

The New Britain-Gridley Division of The New Britain Machine Co., has recently announced the addition of **Gus Gran** to their Detroit sales office and of **Eino Hill** as an additional representative in the Chicago territory, complementing the duties of Jack Barry, longtime Chicago representative.

**Carl L. Sadler, Jr.** has been appointed chief engineer of the Hydraulic Division of Sundstrand Machine Tool Co., Rockford, Ill.

**Wilbur J. Kupfrian**, part owner and engineering director of the Elliott Manufacturing Co., Binghamton, N. Y., has withdrawn from the firm to establish the Kupfrian Manufacturing Co., with offices at the same address; two plants have been set up in Binghamton and Deposit, N. Y.

## Memo re: STEEL STAMPS & MARKING DEVICES

That Newco bevel on New Method's does a swell job of giving clear markings with less effort and longer stamp life.

Better get a copy of their catalog and look it over for ways and means to cut our marking costs.

Write to:

**NEW METHOD STEEL STAMPS, Inc.**  
149 Joseph Campau, Detroit 7, U.S.A.

The appointment of **A. L. Paquette** as manager of aviation products for Westinghouse Electric Corp., Pittsburgh, was announced; he will be located in Dayton where he will be responsible for negotiations on all Westinghouse aviation apparatus with the U. S. Air Force.

Vanadium-Alloys Steel Co., Latrobe, Pa., announces the election of **Harry M. Reed** as a director.

**John C. Ewer** has been appointed assistant general manager of Norton Grinding Wheel Co., Ltd., branch plant of the Norton Co., in Welwyn Garden City, Herts, England, according to Herbert A. Stanton, vice president and general manager of the firm's foreign division. **Raymond J. Forkey**, abrasive engineer, will take over the Boston district vacated by Ewer.

Arthur C. Heller, chairman of the board of Heller Brothers Co., Newark, N. J., has announced the election of **George H. Hodapp** as company president; **James G. Henry** was elected vice president and secretary, Miss Anna W. Ibach, treasurer, and **Eugene M. Steenburgh**, assistant secretary.



George H. Hodapp



F. J. Sikorovsky

**F. J. Sikorovsky** has been elected president of the Federal Drill and Tool Works, aircraft tool manufacturers, New York, a division of Avildsen Tools and Machines, Inc.

Chevrolet-Saginaw Transmission Division of General Motors Corp. have announced that **H. L. Whitmer** is now master mechanic of this plant; **E. A. Carlson** has filled the position of general foreman under Whitmer.

Heppenstall Company, Pittsburgh, announces the election of **Harry W. Davidsson** as secretary-treasurer of the company and a member of the board of directors.

**QUICK GEAR CHECK!**  
NO NEED TO MEASURE O.D. OR  
COUNT THE NUMBER OF TEETH  
*for Every  
GEAR  
USER!*

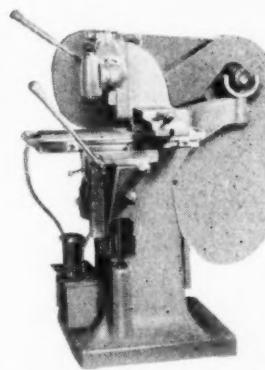
**GEAR GAGE  
PAPER  
WEIGHT**  
▼  
COMPOSED OF  
12 STAINLESS  
STEEL, HIGHLY  
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INCLUDING  
24 DIFFERENT  
GEAR SHAPES

AVAILABLE  
IN 14 1/2 DEGREE  
AND 20 DEGREE  
PRESSURE ANGLES

PRICE \$12.50  
SPECIFY 14 1/2°  
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**GEORGE SCHERR CO. INC.**  
COMPLETE LINE OF PRECISION INSTRUMENTS  
198 LAFAYETTE ST. • N.Y. 12, N.Y.



**U. S. No. 1 MILLING MACHINE**  
has proved itself the number one value in medium size,  
all purpose hand milling machines. New universal  
attachment doubles its scope. Send for information.

**The U. S. MACHINE TOOL CO.**  
A Division of U. S.-Burke Machine Tool Co.  
20 East 72nd St. Cincinnati 16, Ohio

Miner W. Allen, president of Aquadyne Corp., New York 17, N. Y. recently announced the appointment of **Gloster P. Hevenor** as the company's executive vice president.

**George L. Carr** has recently been appointed assistant to the sales manager of Colonial Broach Co., Detroit, in charge of estimating.

**Stoddard M. Stevens**, a partner in the law firm of Sullivan and Cromwell, New York, was elected a director of The Babcock & Wilcox Co., New York, it was announced by Alfred Iddles, president.

# CONE-LOC DRUM SANDER



ENDS Endless  
Belt Troubles  
•  
Cuts Abrasive  
Bills up to 90%  
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Send for complete details and information about our special trial offer. Many large plants...John Deere, RCA, Thompson Products, General Motors, and others...are effecting real economies with CONE-LOC DRUM SANDERS. Write today!

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Please send prices and details of your special plant trial offer.

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Firm Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## SPEED ASSEMBLY WITH TOPFLIGHT TAPE



**C. J. Marlett**, representative for Kennametal, Inc., in the Chicago district, has been transferred to the firm's engineering department at Latrobe, Pa., where as project engineer he will be engaged in research and development of new Kennametal applications.

The directors of Lincoln Park Industries, Inc., Jamestown, N. Y., elected **Gene DeMambro**, president of the corporation, which includes in addition to the Lincoln Park, Michigan plant, the Curtis Machine and Standard Portable Cord divisions at Jamestown, N. Y.



Gene DeMambro



H. L. Bills

The board of directors of Acme Steel Co., Chicago has recently elected **H. L. Bills** as vice president in charge of industrial relations, it was announced by Carl J. Sharp, president.

**Hollis H. Mesher** has been named sales engineer for Illinois Tool Works, Chicago manufacturers of metal cutting tools, in the Detroit sales office, at 2895 E. Grand Blvd., it was announced by E. E. Valy, sales manager.

**Joseph A. Martino**, president of National Lead Co., has been elected to the board of directors of Allegheny Ludlum Steel Corp., Pittsburgh.

Mark parts, sub-assemblies quickly, easily with printed pressure-sensitive tape. Range of colors, special constructions

**TOPFLIGHT TAPE CO.**  
**YORK, PENNSYLVANIA**

## *How* SQUARE HOLED SLEEVES ! SPEED UP TOOL-MAKING !

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. The hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

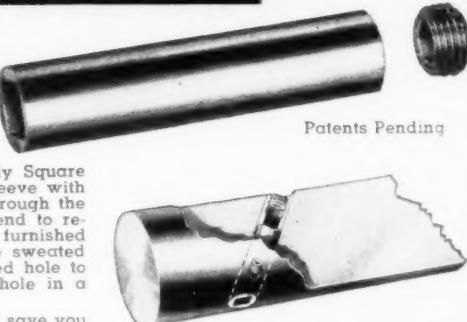
### BUSHINGS MADE IN FOLLOWING SIZES:

3/16, 1/4, 5/16, 3/8,  
7/16, 1/2, 5/8, 3/4, 1"

### STURDY BROACHING SERVICE

23516 TELEGRAPH RD., DETROIT 19, MICH.

Patents Pending

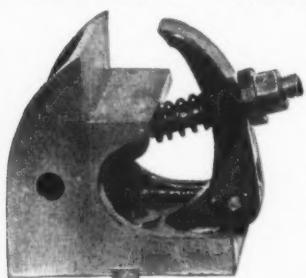


*Write for  
Literature*

## HART MILLING FIXTURES

### "MASTERS OF 1000 SET-UPS"

*Little need for Expensive Jigs or Fixtures*



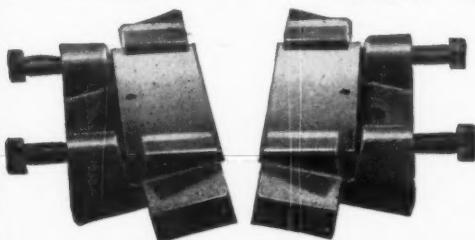
These fixtures make themselves popular and profitable in any shop—are used in either horizontal or vertical position. Suitable to hold round hexagonal, octagonal, or square stock, aligning the work with the machine. Grip holds the work on the bottom as well as on the back. Generally sold in pairs. Made in 4 sizes—to hold stock from 1/2 to 5 inches.

### HART MACHINE VISE JAWS

These Jaws are very useful on any machine table. They clamp or bolt to the table, the angles firmly holding the work down. Each hardened tool steel jaw measures 3"x6"x1/2". The angle edges are serrated.

**Write for illustrated folder & prices  
We also manufacture Hart Index Centers.**

**HART MACHINE CO.**  
**26 Mather St. Dorchester, Mass.**





**NEUTROL  
Magnetic  
Chuck  
Controls**

# WHEREVER MAGNETIC CHUCKS ARE USED



THE ELECTRO-MATIC RECTIFIER AND NEUTROL MAGNETIC CHUCK CONTROL ARE INDISPENSABLE FOR BETTER AND SAFER GRINDER PERFORMANCE

NEUTROL Magnetic Chuck Controls speedily release and demagnetize workpieces. With NEUTROL, there's no need to hammer or pry to release the work. This saves time and tempers—saves marred, distorted workpieces and prevents damaging of chuck faces. NEUTROL also protects chucks against harmful voltage surges.

ELECTRO-MATIC Rectifiers are sturdy, heavy duty, direct current supply units, engineered to "stand up" day-after-day in the hardest service. They are available in any desired voltage combination in capacities ranging from 50 to 20,000 watts.



NEUTROL and ELECTRO-MATIC Rectifiers can be installed easily on equipment already in use—or built into new machines before delivery if you so specify.

Let us send bulletins giving full information—no obligation.

**ELECTRO-MATIC PRODUCTS CO.**  
2235 North Knox Ave., Chicago 39, Illinois

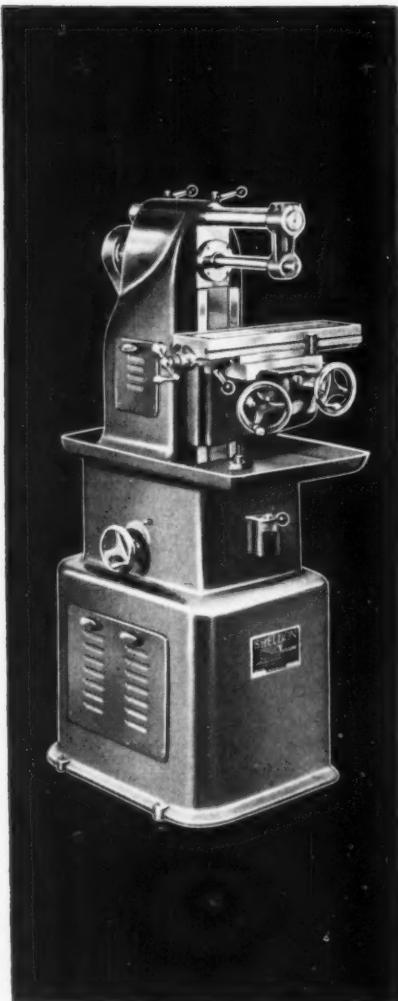
**ELECTRO-MATIC**

**Industrial  
Rectifiers**

MACHINE and TOOL BLUE BOOK

## Literature Mentioned in This Month's Advertisements

41. **Index Milling Machines**, ideal for the tool room, excellent for light production; Models 55 and 60, improved vertical and plain horizontal types stress extra capacity and versatility of operation. Complete literature available upon request. **Index Machine Co.**, 540 N. Mechanic St., Jackson, Mich.
42. **Timesaver Lapping Compound** assures precision finish on fitting jobs requiring extreme accuracy; can be applied without special tools by the average mechanic. Samples and literature upon request: **Timesaver Products Co.**, 546 W. Washington Blvd., Chicago 6, Ill.
43. **Oliver Drill Pointers** save tool room time and money; twist drills sharpened on the Model 510 are said to be more uniform and have longer drill life, since the Drill Pointer produces a theoretically perfect point that remains constant. See advt. on page 31, or write for literature to **Oliver Instrument Co.**, 1408 E. Maumee St., Adrian, Mich.
44. **Grinders** of all types, including Wet and Dry, Drill and Disc, Bench and Pedestal, Lathe and Center, High and Low Speed, for production or tool room. New catalog No. 71 BA lists over 200 different types and sizes of Grinders from  $\frac{1}{4}$  to 25 h.p. capacity. **The Hisey-Wolf Machine Co.**, 2620 Madison Road, Cincinnati 8, O.
45. **Deep Throat Punch Press** designed for jobs where extra reach is needed; machine punches to the center of a  $17\frac{1}{2}$ " circle; has a 4-ton impact with each stroke, and hits 285 times per minute. Available in either 1" or  $1\frac{1}{4}$ " stroke, others to order. Complete details available from **Benchmaster Manufacturing Co.**, 2952 W. Pico Blvd., Los Angeles 6, Calif.
46. **Rouse Hand Miller**, inexpensive, high speed, ball bearing, motor driven unit. Can be operated by inexperienced help. Mills small parts faster, resulting in a better product, due to the machine's high accuracy. Descriptive literature will be sent on request to **H. B. Rouse & Co.**, 2214 N. Wayne Ave., Chicago 14, Ill.
47. **Wittek Roll Feeds**, made in standard models to meet a wide variety of requirements in the automatic feeding of strip stock to punch presses and press brakes. Simple and economical operation eliminates complicated parts, assuring speed and accuracy. Complete descriptive litera-
- ture sent on request. **Wittek Manufacturing Co.**, 4321 W. 24th Place, Chicago 23, Ill.
48. **Hardinge "Modern Tool Room Lathe"** with full bearing carriage; equipped with solid steel hardened and ground bed ways; built with sustained accuracy and absolute rigidity. Its design incorporates all features for high speed operation and strict accuracy. See advt. on p. 3 and send for descriptive bulletin to **Hardinge Brothers, Inc.**, Elmira, N. Y.
49. **Denison Multipress** accomplishes such operations as crimping, pressing, riveting, deflecting, staking, etc., in an efficient, production-speeding, low-cost manner. Advanced valving and design of the Multipress permits safe, easy operation at high-production speeds. See advt., p. 12; further details on request from **The Denison Engineering Co.**, 1184 Dublin Road, Columbus 16, Ohio.
50. **Logan Air Control Valves**, feature balanced piston design, minimum down time, self-cleaning, compact design and easy installation. Logan engineering assistance in designing complete air circuits is available, no obligation. Air Control Valve Catalog No. 100, Section 4 now ready. **Logansport Machine Co., Inc.**, 807 Center Ave., Logansport, Ind.
51. **Barber-Colman "Multithread" Hobs** have cut gear hobbing time in two on actual production operations. Tool life 200 gears per sharpening; hobs feature more threads, higher production. Free data available in File No. 7817 will be sent on request from **Barber-Colman Co.**, 7817 Loomis St., Rockford, Ill.
52. **Standard Dializer** converts ordinary AGD adjustable limit snap gage into a low cost dial gage simply by removal of two pins from snap gage. Range of gage adjustment is the same as before installation of the Dializer instrument. Can be installed on any make snap gage. Literature available from **Standard Gage Co.**, Poughkeepsie, N. Y.
53. **Lima Gearshift Drives** solve the problem of continuous heavy steel rolling and beading; their rugged dependability and trouble-free performance have assisted many plants using selective-speed drives; built in a complete range of sizes from  $\frac{1}{2}$  to 25 h.p. Bulletin DB-1 gives complete specifications. **The Lima Electric Motor Co.**, 220 Findlay Road, Lima, Ohio.



## The Logical first Milling Machine

When you decide to buy your first Milling Machine, make it a Sheldon. This moderate price machine tool can be bought as a basic machine that will come within your budget . . . power feeds, universal heads, etc. can then be added as needed.

• • •

Sheldon Milling Machines are rigidly built for continuous, precision service. The spindle is supported in double row Timken Taper Roller Bearings. Fully enclosed variable drive, spindle range 100 to 1100 r.p.m. (with back gear attachment speeds from 25 r.p.m., up). Tapered gibs throughout.

• • •

Write for complete Catalog which includes specifications and attachments.

### Available Accessories and Attachments

Power Feed	Universal Head
Dividing Head	Coolant System
Rotary Table	Swivel Vise
Drip Pot Oiler	

# SHELDON

CHICAGO

SHELDON MACHINE CO., INC  
4242 N. Knox Ave. Chicago 41, Ill.

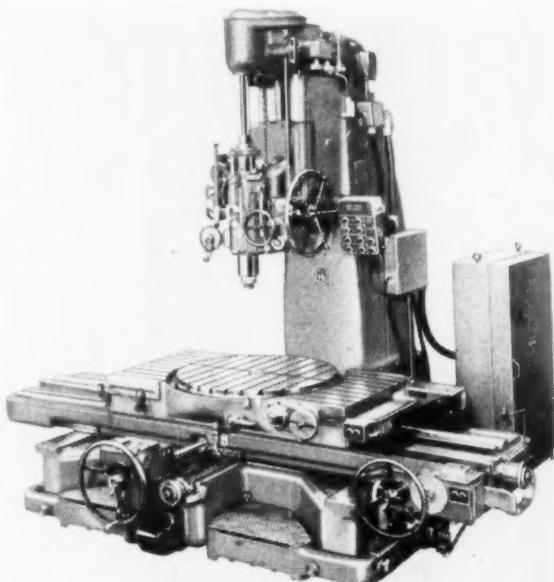
# What's New in MACHINING

## P & W JIG BORER TABLE HAS PRECISION BUILT-IN ROTARY TABLE

A new design in jig borer tables has just been announced by Pratt & Whitney, Division Niles-Bement-Pond Co. Available only on their new No. 4E Jig Borer, this versatile work table provides a large rectangular work area with ample T-slots for holding down work, as well as a precision built-in rotary table for circular indexing and polar co-ordinate work. The overall rectangular dimensions of the table measure 36" x 78" and the rotary table is 48" in diameter. Both rectangular and circular surfaces are hand scraped for flatness. The circular surface is higher by 1.000" ( $\pm .0005$  tolerance) than the rectangular surface to provide clearance when indexing work larger than 48" diameter. 1.000" parallels are placed on the lower rectangular surfaces to utilize the full 36" x 78" working surface.

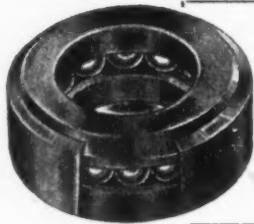
To provide the maximum rotary work range for which the No. 4E Jig Borer is capable, the center of the rotary table is located 6" off center to the left in the rectangular table. This offset increases table travel between machine spindle and rotary table centerlines from 30" to 36", when traversed to the left. When the rotary table is centered under the spindle, the maximum workpiece diameter that will clear the ma-

chine column is 72". Boring can be accomplished on any diameter of this workpiece, from 0" to 72", by traversing the table to the left. Moving the center of the rotary table outward from the spindle centerline, a maximum workpiece of 108" in diameter can be accommodated and still clear the column. However, the minimum boring diameter is limited to



36". By traversing the table to the left, the boring diameter can be increased to

## IT'S ACORN BANDED THRUST BEARINGS



REGULAR  
OR  
SPECIAL  
DESIGN  
TO  
25" O.D.

**For Quality, Dependability  
and Price**

We also make Thrust Bearings interchangeable with other manufacturers. We take in extra work on Blanchard Grinders.

Thrust Bearings Specialists  
For Over 30 Years

**ACORN BEARING CO.**  
68 Stanley St., New Britain, Conn.

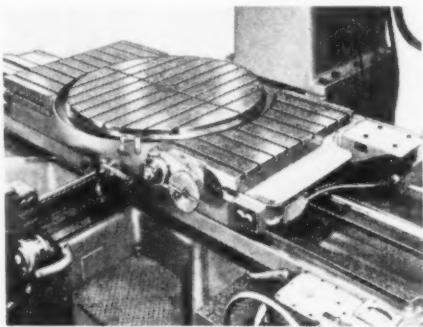
## NIELSEN Heavy Duty *Live* Centers

Write for  
catalog on  
live centers

Adapted  
for heavy  
duty work.  
Precision type  
ball and roller  
bearings assure  
maximum capac-  
ity for high speed  
production and long  
service.

**NIELSEN, INC.** LAWTON,  
MICH.

a maximum of 80". With the rotary table traversed the maximum distance from the spindle, the maximum possible work diameter that can be rotated and clear column is 118". Because column interference prevents further slide movement, the maximum possible boring diameter of 80" can not be changed unless the work piece diameter decreases.



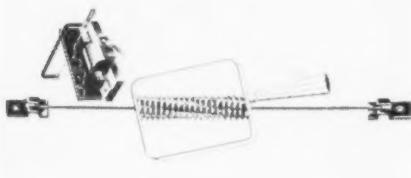
Power rotation in either direction, controlled by push buttons, is provided for rapid indexing. Graduations in degrees are legibly marked on a beveled edge around the entire periphery of the table for approximate indexing. Precision settings to minutes and seconds are obtained through the slow motion hand control wheel. The unit is extremely accurate, indexing in either direction from zero and return to the original zero within a spacing tolerance of  $\pm 15$  seconds in the full 360° of rotation. For complete specifications, write Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn.

### "DAFILE" SAW CUTS IN ANY DIRECTION

A new 360° all-purpose saw known as the Capewell "Dafile" has recently been introduced in the United States. This product, which is being sold exclusively through The Capewell Manufacturing Co. and its distributors, was developed in Sheffield, England. It is designed to fit any standard hack saw frame. The "Dafile" is a specially treated steel wire with non-clogging teeth cut and thrown up spirally around the circumference. An outstanding characteristic of the "Dafile" is its ability to cut in any direction without increasing the size of the slot at the turning point. Although designed for profile cutting, a "Dafile" will readily follow a straight line. There is no necessity, therefore, to replace it with a hack saw blade when a straight

line cut is met with in the course of profile sawing.

Although designed to cut hard metals, the "Dafile" will also cut intricate profiles in plastics, wood, plywood, and other materials. The blade is manufactured



from a mild steel, cyanide hardened and water quenched. The saw is case-hardened to a depth approximately .005", the core remaining relatively soft to give pliability and adaptability to tension.

The "Dafile" is also adapted to high speed cutting in a power jig as well as hand cutting in a hack saw frame. It is made in 10" and 12" lengths, and in rough, medium and smooth cuts in each length. It is inserted in a hack saw frame by means of a pair of links which are separate parts and fit all "Dafiles", therefore, do not require replacement.

For complete information, write **The Capewell Manufacturing Co.**, Hartford 2, Connecticut.

#### NEW BRYANT THREAD GAGE

Newly designed to reduce inspection time and increase accuracy of checking threaded parts, the No. 11 Gage uses the Bryant principle of interchangeable segments so that a wide range of internally



#### PORTABLE ELEVATING TABLE



Saves  
TIME  
and  
LABOR

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15½", leaving operator's hands free. Table swivels and locks in any position.

SEND TODAY FOR ILLUSTRATED  
CATALOG NO. 2

**MIDWEST TOOL & ENG. CO.**  
112 WEBSTER ST., DAYTON, OHIO

"BUILT-IN"  
FEATURE  
*Saves 50%*  
FLOOR SPACE

*Hammond*  
**NO-DUST  
GRINDER**

- Requires only 6½ square feet.
- Protects employees' health — and nearby machine tools from dust and grit.
- For 10", 12" and 14" wheels.

WRITE FOR CATALOG

*Hammond Machinery Builders*  
DOUGLAS AVE., KALAMAZOO, MICH.

or externally threaded parts can be checked on the same basic gage. Internally threaded parts can be checked for fit and inspected for roundness in one operation at the rate of .07 per min. Operator fatigue is low because only the part is handled. One set of segments will check up to 100,000 parts.

The No. 11 Gage can be furnished with a new attachment for checking face run-out in relation to the thread axis. Other features include a universal work holder for internal parts and adaptability to check additional surfaces in relation to the thread. Literature and price list will be sent upon request to **Bryant Chucking Grinder Co.**, Dept. BB, Springfield, Vt.

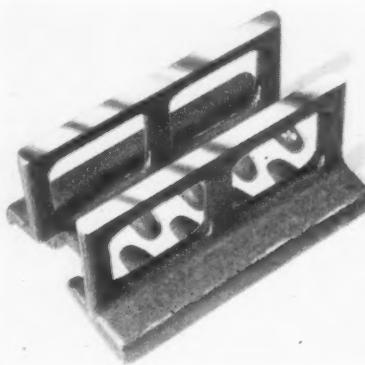
#### THE MAGIC PARALLEL USEFUL TO TOOL AND DIE MAKERS

A new lightweight tool and die makers parallel, known as the Magic Parallel, is being marketed by Montgomery & Co.

Precision ground to .0005" in their full length of high grade semi-steel, the Magic Parallel is said to be particularly useful in tool and die work. Simply by laying a die shoe or a punch holder on the parallels, the operator has ready access for drilling, assembling and inspecting.

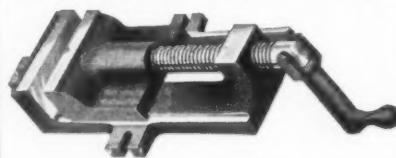
Light enough to carry with the work

from machine to bench, the Magic Parallel's hollow construction makes it easy to grip. The device is non-tippable, narrow, rugged and can be closed completely.



The Magic Parallel is available in five sizes, up to 24" long and 16" high. It is finished in non-rusting black crackle. For complete data, write: **Montgomery & Co., Inc.**, 53 Park Place, New York 7, N. Y.

### YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	3½	12½
2D	5	5½	23

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

**YOST MFG. COMPANY**

1335 SO. MAIN STREET  
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New  
Universal  
Joint!



"...The Ball & Socket Joint with the Toggle Action"

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**B. M. ROOT CO.**  
YORK, PENNA.

### IMPROVED BALL TURNING REST FOR MONARCH LATHES

A new ball turning rest of improved design that contributes to more efficient performance and smoother operation of Monarch 14", 16" and 20" Series 60 Engine and Toolmaker's Lathes is announced by The Monarch Machine Tool Company.

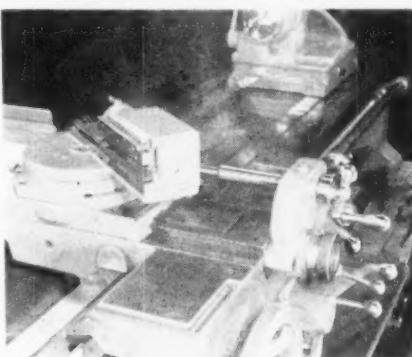
The new design is said to simplify set-up considerably as compared with the difficulties frequently encountered with older designs. Also, its application to the machine is a simple, quick procedure.

The regular bottom slide may be positioned either on center for ball turning or boring, or out of alignment with the spindle center for spherical radius turning. A micrometer dial is provided to adjust the bottom slide in or out.

With this new ball turning rest, a 4" diameter ball can be turned on the 14" Monarch Series 60 Engine or Toolmaker's Lathe, a 5 $\frac{3}{4}$ " diameter ball on the 16" machine, and a 6" diameter ball on the 20" unit. When equipped with a 1" raise, the 16" lathe is capable of turning a 7 $\frac{3}{8}$ " diameter ball.

Boring a socket can also be performed effectively as a result of this basic improvement in ball turning rest design. Maximum size which can be handled is

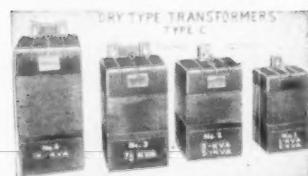
4" on 14" and 16" machines, and 6" on the 20" unit. On some types of work, concave spherical surfaces with larger radii (up to as much as 11" or 12") can be



machined, using a 14", 16", or 20" Monarch Series 60 Lathe. A set-up of this type is illustrated above.

Complete engineering data is available upon request to **The Monarch Machine Tool Co.**, Sidney, Ohio.

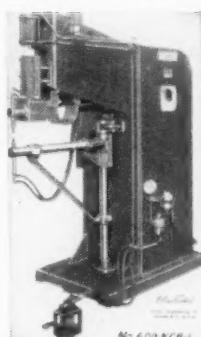
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*EISLER Transformers conform  
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from 5 to 250 KVA)  
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We invite contract spot or butt welding  
in large or small quantities.

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Newark 3, N. J.

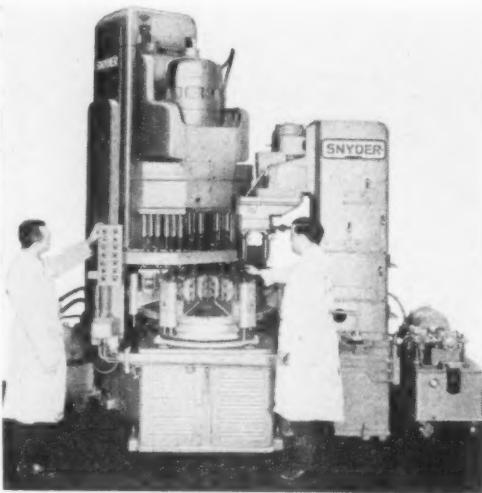
**EISLER ENGINEERING CO., INC.**  
**762 South 13th St., (Near Avon Ave.)**

## SNYDER INTRODUCES 6-STATION MULTIPLE OPERATION MACHINE

A new six-station vertical drilling and tapping machine for processing differential bearing caps has been designed and built by Snyder Tool & Engineering Company.

The new machine drills, spot-faces, chamfers and taps 480 caps an hour at 80% efficiency and 512 at 100%. The work cycle is 21 seconds in duration, and is automatic after the starting button is pressed. The machine is electrically interlocked for safety, and can be operated by unskilled labor.

Four parts are loaded at station No. 1 by the operator on the left and clamped by hydraulic pressure. The fixture is then automatically indexed by a standard Geneva index to the second station, where eight large holes are drilled and four small holes are countersunk. All twelve holes are spot-faced at the third station, and, at the fourth, the four small holes are drilled and the eight large holes are finish-drilled. At the fifth station, the four small holes are tapped. The sixth station is for unloading, which is done by the operator on the right.



Tools are high speed steel and are mounted in standard Snyder multiple spindle heads which move on hardened

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Send for complete Catalog and Quick-finding Selector Charts. Sizes for  $\frac{1}{6}$  to 2500 h.p. Write

**LOVEJOY FLEXIBLE COUPLING CO.**

Mfrs. also of Lovejoy Variable Speed Transmissions, and Lovejoy Universal Joints.  
**5026 W. LAKE ST.**

**CHICAGO 44, ILL.**

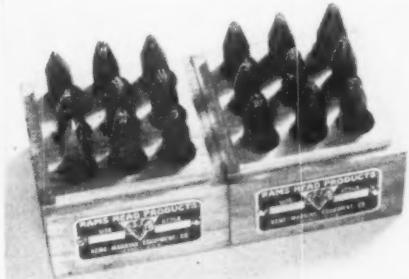
and ground guide bars. All tools are gear driven, gears being 34 Rockwell hardness, shaved and matched for quiet running. Tool speeds are 260 r.p.m. for the larger drills and 1045 r.p.m. for smaller drills. Stroke is 3". The stationary bushing plate is mounted on two bracket pins on each side of the fixture table. Tools are easily accessible for changing by simply raising the head.

The main spindle head is powered by a 25 h.p. motor, the tap head by a 2 h.p. motor, the Geneva index by a 2 h.p. motor, and the hydraulic tanks each have a 3 h.p. motor. One hydraulic tank serves the drill press and the other serves the clamping mechanisms.

The column is cast iron mounted on a welded steel base which is heavily ribbed for rigidity and thoroughly normalized. Coolant tank is separate, in the rear. Required floor space is 140" by 86". **Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit, Mich.**

#### FRACTIONAL FIGURE MARKING STAMPS

The production of a new and larger set of fractional figure metal marking stamps is announced by the Acme Marking Equipment Co. The new set consists of 18 specially hardened steel stamps, giving 1/16" separations, and is offered in a choice of three sizes: 1 $\frac{1}{8}$ ", 3/16", and 1/4", from top to bottom of the entire fraction.



Of the 18 stamps in the new set, 16 are fractional figures, in increments of 1/16th of an inch. To these are added the whole number "1" and an inches sign, to be used in conjunction with any of the other stamps.

The stamps in each set are furnished in two sturdy, compact hardwood cases, with separate compartments for each stamp. Full information is available from the **Acme Marking Equipment Co., 8030 Lyndon Ave., Detroit 21, Mich.**

# WHO\*

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- SET SCREWS
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PENNA.



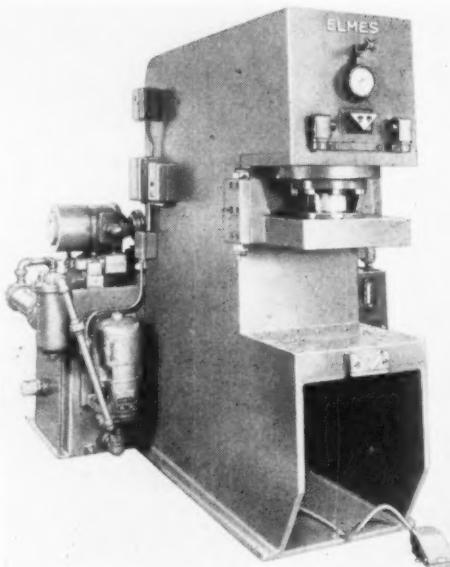
**MICHIGAN CHROME & CHEMICAL COMPANY**  
6340 E. Jefferson Ave. • Detroit 7, Mich.

### ELMES OPENSIDE PRESS HAS 3-WAY OPERATION

Development of a new Elmes Openside Hydraulic Press is announced by the Elmes Engineering Division of American Steel Foundries.

This press, originally designed for a farm implement manufacturer, performs three operations per cycle—shearing, riveting, and straightening on forged steel parts—at 35 cycles per minute. Since the work handled is subject to variations in thickness, multiple operations performed on a single press stroke require precise applications and accurate regulation of pressure. These characteristic features of hydraulic power have been utilized by Elmes engineers in designing a press which turns several troublesome, costly procedures into one smooth, fast, profitable operation.

The press has a moving platen which measures 18" x 16", and a 3" stroke. A high and low pressure pump provides rapid advance, slower pressing speed and rapid return. A photo-electric safety control stops the platen immediately if an obstruction breaks the light beam at the entrance to the dies.



NOTCHING TUBING OR  
PIPE ENDS EASILY WITH

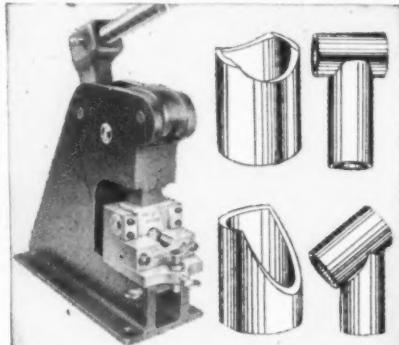
**ARC-FIT**

Patent No. 2,126,519

IN POWER PRESS  
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Are-Fit is a notching unit for preparing pipe or tubing ends in making welded or braised tubular joints. Are-Fit will prepare the ends of a pipe or tube in less than 5 seconds. Are-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

- Are-Fit can be utilized in any power press.
- Are-Fit can be furnished for any size tubing or pipe.
- A hand press can be supplied with Are-Fit units for shearing pipe or tubing sizes 2 inches or under.



- For sizes over 2", angular cuts other than 90°, and slotting operations. Quotation furnished on request.
- Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
- Engineers can now design for tubular construction and cut costs.

Write today for circular and prices.

Manufactured Exclusively by

**VOGEL TOOL & DIE CORPORATION**

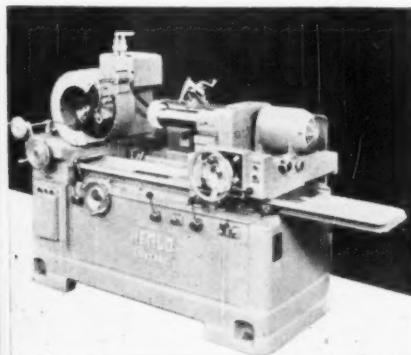
2525 Moffat Street

Chicago 47, Illinois

The new Openside Hydraulic Press is accessible, fast and flexible. Sizes and capacities can be provided for a variety of service needs. Complete engineering details and cycle description of the press—also Catalog 1010B, "Hydraulic Metal-Working Presses"—will be sent upon request. **American Steel Foundries, Elmes Engineering Division, Cincinnati 29, Ohio.**

#### UNIVERSAL INTERNAL GRINDING MACHINE

The new Heald Model 274 Universal Internal Grinding Machine, illustrated below, is designed for a wide variety of tool room work but is stated to be equally well applied to longer production operations. The workhead on this new model



may be swiveled up to 90°, providing wide angular capacity; it is driven hydraulically, permitting an infinite variety of speeds within the range of 40 - 350 r.p.m. This machine will grind straight or taper holes, straight or taper outside diameters and flat or convex surfaces.

For complete details, write **The Heald Machine Co., Dept. BB, Worcester 6, Mass.**

#### CENTER DRILL FOR HARDENED STEEL

A new Center Drill for hardened steel is announced by National Tool Salvage Company. The tool was originally developed for use in the manufacturer's own shop where it was necessary to drill new centers on tools that had been ground off, or on which centers were so worn as to be useless.

Cutting centers in such tools without annealing has, heretofore, been difficult, and involved two operations: drilling and countersinking.

A catalog sheet lists standard sizes and prices. **National Tool Salvage Co., 6511 Livernois Blvd., Detroit 10, Mich.**

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**RIVETERS...**  
PIONEERS  
and  
PACEMAKERS  
in their line

—head sizes from smallest to  $\frac{3}{8}$ " diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

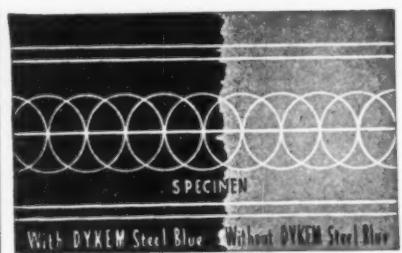
**THE GRANT MFG. & MACHINE CO.**  
C E Station,  
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**MARK and DEMAGNETIZE  
IN  
ONE OPERATION**

**Luma** THE WAY

The Luma combination etchtool and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

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**DYKEM STEEL BLUE  
STOPS LOSSES  
making dies & templates**

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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More than 1,000 pieces per hour! Increase production and cut assembly costs with HIGH SPEED for staking or riveting fixed and movable joints. Foot treadle ... Safe ... Uniform ... Adjustable hammer blow. Send for literature.

**COLD RIVETERS**

Send us samples of your work completed to the riveting stage. In return we'll supply guaranteed production data and experienced counsel on your fastening problems. No obligation. Write today. It's free.

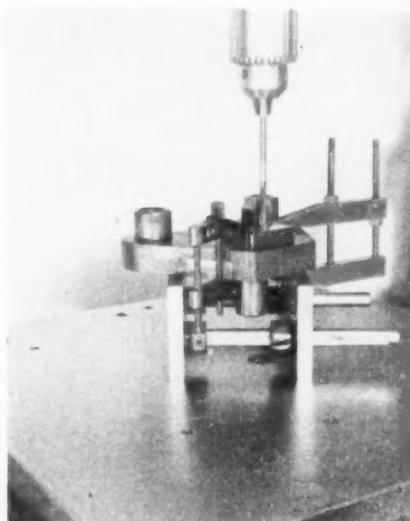


**HIGH SPEED  
HAMMER CO., INC.**

311 Norton St. Rochester 5, N. Y.

**ADJUSTABLE PARALLELS HAVE  
WIDE TOOLROOM USE**

A new adjustable parallel has recently been introduced by Tinker's Thread Grinder Co. The device consists of two grey iron castings which are adjustable sideways by sliding on two cold rolled steel bars. The parallels can be locked in different positions by two flat point set screws in one casting and two thumb screws in the other.



These precision units can be used or drill presses to raise the work above the table, affording greater clearance for clamps, guide pins or guide posts, and to give clearance for shanks on the top shoe of die sets while work is being drilled, reamed or counterbored.

The magnetic chuck of a surface grinder will hold the parallels down so that the top shoe of die sets can be clamped to the top of the parallel, and the punches sharpened.

The Timken adjustable parallel has wide range of usefulness in metalworking shops. It can be used on a surface plate to check or lay out work. It is handy for assembling bench fixtures, die sets and special machines. The device saves both time and money by being together at all times; there is no time lost in looking for separate pairs of parallels. The unit is painted bright red for quick location and identification.

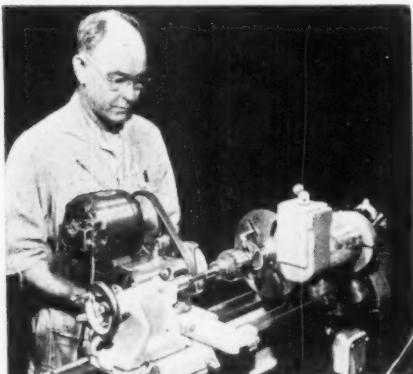
The adjustable parallel is available in

three sizes, with heights of 4", 6" and 6", and corresponding lengths of 10", 12", and 18"; openings are adjustable from 3 $\frac{1}{4}$ " to 11 $\frac{1}{4}$ " on the small set and 4" to 20" on the large. For complete data, write **Tinker's Thread Grinder Co.**, 136 Granby Road, South Hadley Falls, Mass.

#### **NEW TOOLPOST AND BENCH GRINDER**

The Utility Grinder, dual-purpose, toolpost and bench grinder is announced by The Dumore Company.

Accurate to .0002", the 1/4 h.p., 500 r.p.m. Utility Grinder fits lathes of 9" to 13" swing for external cylindrical grinding, and mounts on shapers, planers or milling machines for surface grinding. When not needed for precision work it quickly converts to bench use for burring castings, cleaning welds, wire brushing, polishing, tool sharpening. The wide work range of the Utility Grinder permits repair shops, welding and metalizing shops, and machine shops to get both those occasional special grinding jobs and the everyday production jobs finished fast and at low cost.



To obtain accuracy and stamina, construction is both precision and heavy-duty. Features include a heavy cast frame for rigid mount, minimum vibration; a 1/4 h.p., constant-speed, continuous-duty motor; a permanent-mount spindle with precision pre-selected bearings, pre-loaded and grease-sealed for life; fast, ingenious belt-tension adjustment; a combination belt and wheel guard; a T-bolt for fast lathe, vise and bench mounting.

The Utility Grinder is available for both 110 and 220 volts, a.c., 60 cycles. Diamond wheel dresser is available as extra equipment. Further information is available on request to **The Dumore Co.**, Dept. C-27 Racine, Wis.

## **RIVETING?**

*use*

### **LINLEY Noiseless Riveting Machines**

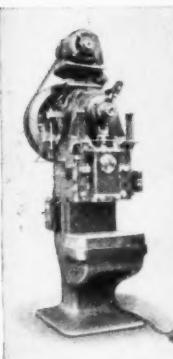
Sturdy, fast, easily operated! Put your production rivet spinning jobs on Linley Riveting Machines and watch your costs come down.

We are glad to demonstrate the quality of work that can be turned out. Send us samples of your parts and you'll be impressed with what you can do and how little it will cost you. Sizes and types available for iron or cold rolled steel rivets up to  $\frac{3}{8}$ " with capacity for larger rivets of softer materials.

*Send for descriptive bulletin R.*

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**80% to  
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Ferracute P Presses now more productive than ever. Cut mfg. cost. Shearing, forming, punching of heavy stock, 20 to 150 tons. Write for full specifications.

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Metal Cutting

Has low speed  
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direct connected  
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to cut heavy and  
light sections  
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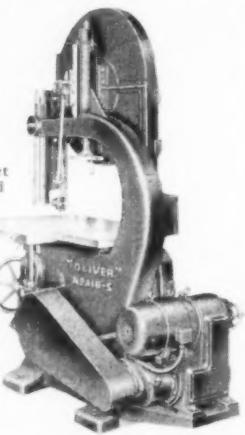
Also furnished  
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metals, woods and  
compositions.

Powerful!  
Cuts true  
and  
Steady.

Quick-change  
rim and tire.

Automatic  
brakes.

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Oliver Mach'y Co., Grand Rapids 2, Mich.

it's *Cheaper to*  
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**SMALL PARTS**

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**SCHAUER**  
*speed lathes*

Users report savings of from 30% to 90% in secondary finishing costs when Schauer Speed Lathes are used. Learn how you can use these low-cost, high-production machines. Save with Schauer.

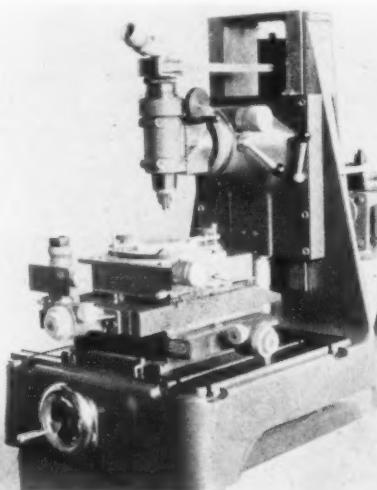
*Write for Catalog 480*

**SCHAUER MANUFACTURING CORP.**

• Originators of Today's Speed Lathes  
2064 Reading Rd., Cinc. 2, Ohio, U.S.A.

## SCHERR INTRODUCES LEITZ OPTICAL JIG BORER

As already reported in the April 1950 issue of **Machine and Tool Blue Book** on page 276, George Scherr, president of the New York firm of George Scherr Co., recently returned from an extended European trip during which time he secured for his organization the American representation rights to several of the outstanding European precision machine tools. Among these fine new instruments and tools is the Leitz Jig Boring Machine with optical setting and microscopic inspection through the spindle.



This unit is for work within the range of 6" x 6" where the highest precision is a requisite. The setting of the longitudinal and cross slide is effected, not by screws or micrometers, but by built-in precision glass scales, which through proper illumination are read with a microscope eyepiece graduated in .00005". The operator reads both the length and cross measurements in the same eyepiece by shifting a lever without moving from his position. The glass scales have a coefficient of expansion corresponding closely to metal, and since the scales are only looked at, there will be no wear, nor are any compensating devices required. When work pieces which differ in weight, as, for instance, when a heavy steel body and a light cover are to be machined, there will be no variance, since the purely optical setting does not in-

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No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads . . . their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time . . . Money . . . Labor!

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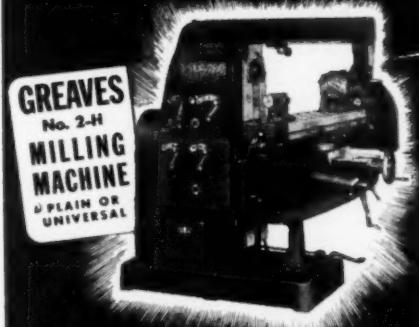


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Simple in design. Easy to operate. Rigid construction including every worthwhile modern feature of milling machine development. With 18 spindle speeds (20 to 1000 R.P.M.) both the universal and plain millers are readily adaptable for heavy duty or light precision production work. Send for bulletin.

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volve measuring pressure differences due to weight.

The spindle is a combination drilling spindle and microscope. When the drill is removed, the microscope with concentric circles becomes operative. The work may thus be spotted, drilled and inspected without removing it from the table.

For holes up to  $\frac{1}{8}$ ", flat drills are used; for larger sizes up to  $\frac{1}{2}$ ", an adjustable boring tool is furnished. Also a spring-loaded scribing tool for layout work is contained in the standard equipment.

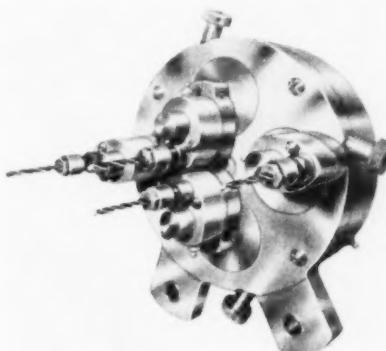
For complete data on this Optical Jig Borer made by the firm of Ernest Leitz, Wetzlar, Germany, write **George Scherr Co., Inc.**, 198 Lafayette St., New York 12, New York.

### ERRINGTON ADJUSTABLE DRILLING HEAD HAS WIDE RANGE

Errington Mechanical Laboratory, Inc., announces the introduction of a completely new "Fully Adjustable Drilling Head." This versatile tool is light and compact, and offers a wide range of adjustment. It can drill in squares, rectangles, circles, triangles and irregular patterns. The head is fully geared. All spindles are equipped with grooved thrust ball bearings. Needle bearings are provided wherever possible. All moving parts of the unit are hardened

A simple finger tip locking arrangement is provided.

The Errington "Fully Adjustable Drilling Heads" are made with three, four and six spindles. Sizes are from 0 to  $\frac{1}{4}$ ", from  $3\frac{1}{16}$ " to  $1\frac{1}{2}$ ", and No. 2 Morse Taper



socket capacity. For complete literature, write to **Errington Mechanical Laboratory, Inc.**, Staten Island 4, N. Y.

### NEW SOUTH BEND 10" LATHE

The South Bend Lathe Works has announced a new 10" Quick Change Gear Lathe in four bed lengths. The S-B Light Ten Lathe is a precision tool equipped with the most up-to-date improvements and refinements.

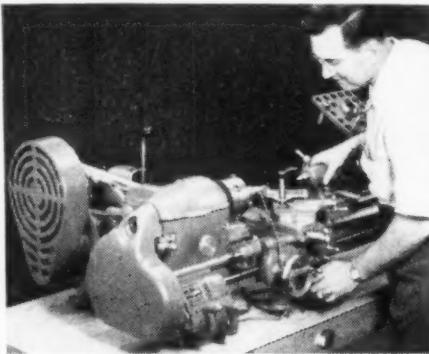
A complete line of Tools, Attachments, and Accessories, including a taper attachment, handlever and handwheel collet attachments, collets, a milling attachment, etc. are available for this unit.

The bed of this new 10" lathe is rigidly constructed of gray iron with 30% steel content added, producing a hard close-grained bed of high strength and long wearing qualities. Three V-ways and one flat way are hand-scraped their entire length to assure precision alignment of the headstock, tailstock, and carriage.

The back-gearied headstock used is hard-scraped to the bed to assure precision alignment of the spindle. A wrenchless bull gear lock permits easy shifting of the back gears. All gears are fully enclosed by hinged guards and are machine cut.

Bearings for the headstock spindle are of the replaceable bronze sleeve type. The use of sleeve bearings to carry the radial load is said to aid in preventing

chatter marks on the work due to vibration which might be set up with other types of bearings. Large oil reservoirs and a proved capillary oiling system provide a film of clean filtered oil for



the rotating spindle. An efficient oil return system retains the oil so that only an occasional replenishing is required. A ball thrust bearing and take-up nut

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### Hand-Cut STEEL STAMPS

### Letters & Figures



Deep, hand-cut letters in special-formula steel assure clean impressions and long service. Face of stamp is angled for extra strength. Chamfered corners for locating the base. Ask for Hoggson Brand at mill supply houses.



**HOGGSON & PETTIS MFG. CO., New Haven, Conn.**

eliminates spindle end play. The spindle bore is 27.32", maximum collet capacity,  $\frac{5}{8}$ ". The headstock spindle is made of a special quality alloy spindle steel, with all bearing surfaces carburized, hardened, and ground.

The quick change gear box provides 48 thread cutting feeds, power longitudinal feeds, or power cross-feeds.

The carriage has long bearings (9-7 16 inches) on V-ways of the lathe bed, providing a solid support for the cutting tool. Saddle V-ways are handscraped to match V-ways of lathe bed and are fitted with felt wipers to clean and oil the bed. Carriage lock for facing operations is conveniently located on front wing of saddle.

Two types of horizontal drive units are available for this new 10" lathe: a 12-speed (48 to 1435 r.p.m.) drive using a flat leather belt to the headstock, and a 16-speed (52 to 1365 r.p.m.) drive with a V-belt to the headstock.

For complete specifications of the new South Bend Light Ten Lathe write to **South Bend Lathe Works**, 426A E. Madison St., South Bend 22, Ind.

#### KNITTED WIRE FLEXIBLE MESH

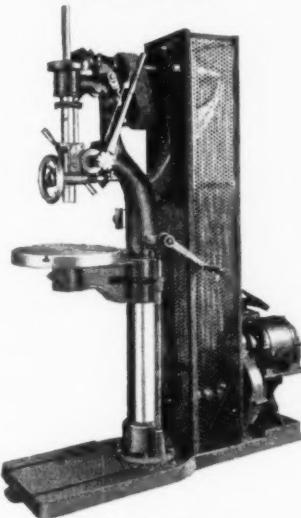
Letraw Manufacturing Company specializes in the manufacture of knitted wire flexible mesh, made of round or flat, copper, steel or any other metallic wires. Sizes of wire range from .005" to .012". Width of mesh can be made from one inch to seven inches. This mesh can be furnished plain or crimped.



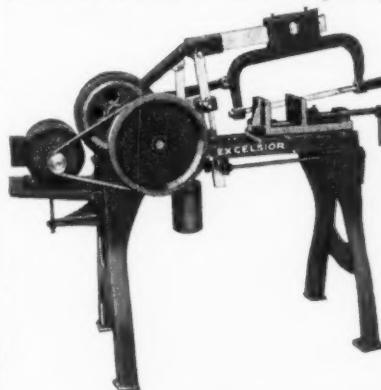
Flexible wire mesh lends itself to many uses, such as air and oil bath filters and breathers for the automotive field, or any type of gasoline engine. There are hundreds of uses for this type of material. It can be furnished in rolls or made into elements to fit any requirements.

All mesh is made to customer's specification. Samples are available upon request. The company also makes galvanized steel knitted balls of flattened wire for scraping and cleaning purposes. For complete information, write: **Letraw Manufacturing Co.**, 229 W. Illinois St., Chicago 10, Ill.

#### ROYERSFORD-EXCELSIOR 21-INCH MOTOR-DRIVEN BACK-GEARED DRILL PRESS



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New Plant and Lab., Bergenfield 3, N. J.

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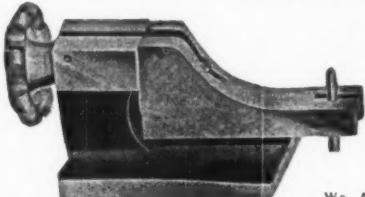
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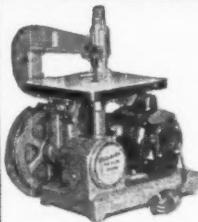
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ONE TOOL measures ALL standard and non-std. 60-degree threads using plain micrometers. Simplest system yet devised. Add a constant to the O.D. and get the proper measurement, even for SPECIAL threads. No formulas—only simple addition. Comes with Constant Chart.

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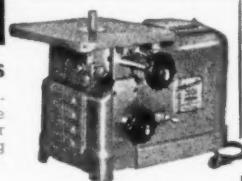
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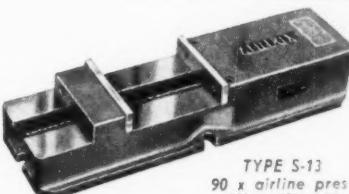
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TYPE S-13  
90 x airline pres.  
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Max. jaw opening 12"

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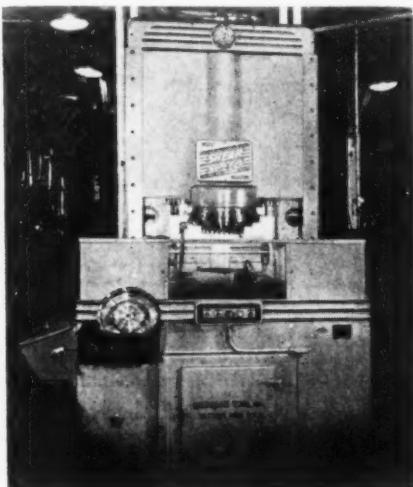
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**GROBET FILE CO. of AMERICA, INC.**  
421 Canal Street N. Y. 13, N. Y.

**SHEAR-SPEEDS FOR INTERNAL GEARS  
AND OTHER INTERNAL FORMS**

Availability of Shear-Speed machines for cutting of internal spur gears, splines and other miscellaneous forms is announced by Michigan Tool Company.

Almost any irregular shape can be cut, providing it lends itself to form-cutting with rapidly fed tools. Minimum size (i.d.) which can be handled is 5.4". The maximum inside diameter which can be cut is approximately 20". In some cases even smaller and larger gears can be cut.



**ECONOMY**  
HEADLESS AND  
SOCKET SET SCREWS



**TRY THEM ON YOUR  
NEXT JOB**

**ECONOMY MACHINE PRODUCTS**  
5212 LAWRENCE CO., CHICAGO 30, ILL.

In operation, the "internal gear" Shear-Speed machines (illustrated) simply reverses the tool-feed action of the machines used for cutting of external forms. Using two inverted cones, the tools are fed outward before each stroke of the reciprocating work and its holder. They are retracted slightly before the return stroke to prevent tool drag. Feed is decreased to finish-feed as the proper depth of cut is approached. Two or three strokes at exact depth (without feed) are generally used to "clean up" before the head retracts and the machine stops for reloading.

The first of the internal gear machines put into service has already cut 5000 gears of 12" pitch diameter without requiring a tool grind. Machine cycle time on this job was 24 seconds for an hourly production of 85-90 parts.

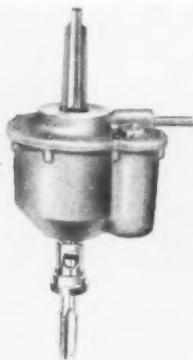
When necessary, tools are reground as on other types of Shear-Speed machines

by locking the individual form tools together on the magnetic chuck of a surface grinder and merely removing a few thousandths (.010-.015 in.) from the top face of the tools, simultaneously. No other grinding is necessary. For complete data, write **Michigan Tool Co.**, 7171 E. McNichols Road, Detroit, Mich.

#### NEW TAP HEAD SIMPLIFIES LARGE HOLE TAPPING JOBS

The basically new Procurier "Tap King" high speed tapping head promises to revolutionize methods and costs on large hole tapping jobs, according to its manufacturer. In test after test on actual production jobs, this new tapping unit has simplified large hole tapping, increased production many times over, extended tap life and maintained an accurate, uniform thread depth. Operator fatigue was definitely reduced as well.

One test made with this new tap head, using a 15/16"-9 tap 17/8" deep hole tapping in high carbon steel forgings, resulted in a production increase of 50%.



Construction features include: a capacity of  $\frac{3}{8}$ " to 1" in steel,  $1\frac{1}{8}$ " in softer materials; smooth, powerful friction clutch; spline drive to tap holder spindle (a Procurier "first") ball and needle bearings; rigid, accurate, lightweight Tru-Grip tap holder; helical back gear reversing mechanism and many other unusual features.

The Procurier "Tap King" is available with No. 3, No. 4 or No. 5 Morse taper shank. It is also made in a cover clamping model for extra rigidity, accuracy and long life. For full details on the new "Tap King" large hole tapping head write: **Procurier Safety Chuck Co.**, Dept. 20, 14 S. Clinton St., Chicago 6, Ill.

#### FLEXIBLE PRODUCTION MARKING \$20



- Operates on electric hammer principle.
- Eliminates etching grounds.
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The DERBYSHIRE ELECT lathe with 18" bed; ball-bearing headstock with collet closer attachment; double compound rack-and-pinion slide rest with front tool post slide graduated to swivel 360°; six-position turret to take standard tools.

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The same Rams-Head Wheel will, after heavy stock removal, finish grind all metals and produce a finish comparable to that produced by a fine grit wheel. Rams-Head Wheels run cool and load slowly because of porous structure. Write for price list and send us a sample order.

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Speed up production and reduce costs by driving from 2 to 6 screws at a time with Reynolds Multiple Spindle Screw Driving Machines.

A complete line of production type Screw Driving Machines for every application.

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**MEDIUM-WEIGHT DRILLING MACHINE**

A new medium-weight drilling machine, with a 25" swing, is introduced by Sibley Machine & Foundry Corp. The new 765 lb-weight drilling machine has been developed to fill the gap between the larger heavier type and the light bench class.



The Model E-25 incorporates many unique design features including a big swing of 25", a variable speed drive from which the exact spindle speed may be obtained for any size drill from  $\frac{1}{8}$ " to 1" and an extra large rectangular 18" x 26" table with coolant trough.

A sensitive drilling machine powered by a 1½ h.p. Axial Air Gap type motor, the new unit is suited for high speed production. Its design adapts it to the requirements of both maintenance or small shop work. Rated capacity of machine is  $\frac{3}{4}$ " in steel and 1" in cast iron.

The wide range of spindle speeds available is obtained by a convenient self-locking speed control convenient to the operator. There are no belts to change. A tachometer on the front of the machine provides accurate reading of speeds. Five options of spindle speeds each with a 4 to 1 ratio are available, ranging from a low of 206—825 r.p.m. to a high of 540—2160 r.p.m., with a 3 phase 60 cycle motor. A speed chart on side of machine

shows proper speeds for different drill sizes.

Other features include full floating ball bearing spindle with the maximum travel of 8"; 4 $\frac{1}{2}$ " diameter solid column; table accuracy maintained to .0007" in a six-inch radius.

For full information, write for Catalog No. 69 to **Sibley Machine & Foundry Corp.**, Dept. BB, 30 E. Tutt St., South Bend, Ind.

#### "JIFFY-JIG" WORK HOLDING FIXTURE

The "Jiffy-Jig," a simple, quick acting collet type work holding fixture for secondary operation drilling, milling, tapping, boring and grinding is announced by Rigid Products Company. With the Jiffy-Jig, an easy 2" travel of the knob gives rigid, accurate work support in either a horizontal or vertical position. A separate arm (not illustrated) rigidly supports a drill jig bushing in any selected position with respect to the work for cross hole drilling.



An easy operating spring ejector is available which automatically kicks the work into a pan on release of the collet, for rapid operation on production work, the same number of motions being required as with air operated fixtures.

An adjustable stop positively locates non-shouldered work. There is no axial motion of the collet in opening and closing, making accurate control of lengths possible.

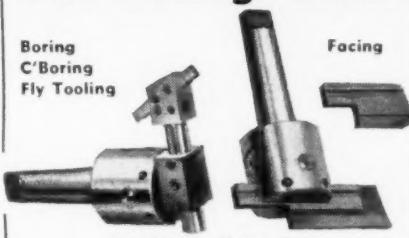
Collets are available in sizes from 1/16" to 1" diameter in round sizes, or up to 15/16" in hexagonal sizes, and can, if necessary, be interchanged with standard Warner and Swasey No. 2 collets.

For complete data, write **Rigid Products Co.**, Dept. BB, 16 Allen Ave., Cincinnati 15, Ohio.

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Many enthusiastic users report that the Behr Boring Bar actually pays for itself in the first four weeks of operation. Just ask the man who uses one.

This proven patented bar is chatter proof, extremely accurate and ultra efficient. Has interchangeable blades and accessories. It is unequalled for versatility and efficiency.



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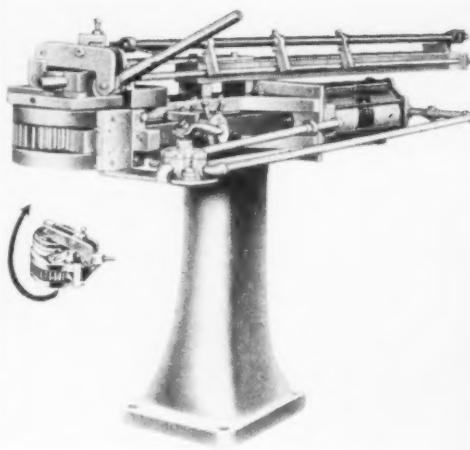
**BEHR** PRODUCTS COMPANY  
WARREN, MICHIGAN

### PNEUMATIC TUBE-BENDING MACHINE

A new air-operated tube-bending machine, known as the Bend-Ex will make between 400 and 500 S-bends per hour in 1" diameter metal tube. The radius range is from 1½" to 6½". The standard unit includes a die clamp for 1" tube on a 2" radius bend. The operation is on a 70-pound air supply or more. The bending head is interchangeable for angle iron (two pieces of angle iron are bent simultaneously).

One easily accessible lever controls all bending operations and the return of the bending head. The control centers at a pneumatic operating valve beside the bending head. Six adjustable stops permit setting various angle bends in one sequence of bending operations. Thus, many changes of angles for design improvements can be made without affecting the speed and simplicity of operation of the unit.

Clamps are interchangeable for switching tube sizes or angle iron and bend radius. There are three adjustable length stops for setting lengths of tubing to control the distance between bands. The work clamp on the machine's

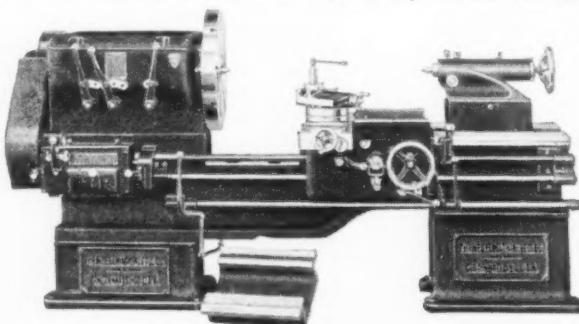


head is made of hardened tool steel, with a patented rigid wedge.

The manufacturer states that one complete tubular chair with eight bends can

## NEBEL Removable Block Gap Lathes

furnished in the  
Geared Head Motor Driven Type, 3 Step Cone Double Back Gear Belt Driven Type or with  
Motorized Headstock. Especially adapted for repair and maintenance as well as for  
general manufacturing. Handle a large variety of work with large swing through the gap.



All Geared headstock type completely equipped with Timken Bearings, with motor mounted on rear of lathe. Quick change gear box, compound rest, steady rest, chasing dial, face plate, driver plate, wrenches, tool post and centers.

Furnished in four different sizes as follows:  
Series "LN" 18/27",  
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Series "B" 22/33", and  
Series "D" 25/40".

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Giving Complete  
Information

**THE NEBEL MACHINE TOOL COMPANY**  
**CINCINNATI 25, OHIO**

be completed without once removing the tubing from the mandrel. The unit is capable of turning out 60 complete chairs per hour. The construction allows ample clearance both over and under the bending head for work requiring multiple bends. For complete description of the Bend-Ex, write **Paul Machine Tool and Die Works**, 4600 S. Kedzie Ave., Chicago 32, Illinois.

#### PERMANENTLY LUBRICATED PILLOW BLOCKS

The new Lubralife Pillow Blocks are designed to handle heavier loads and higher speeds than conventional bearings, according to the manufacturers, Congress Drives Div., Tann Corporation.

A cavity filled with sponge iron acting as a wick, plus the high porosity of the bearing itself insures adequate lubrication for the entire life of the bearing. By impregnating the metal with a special lubricant, under pressure, filling both the sponge iron section and the pores in the metal, the lubricant forms a thin, protective coating around the shaft, without dripping. Adequate lubrication is thus assured without requiring further attention or maintenance, with no danger of the shaft freezing.

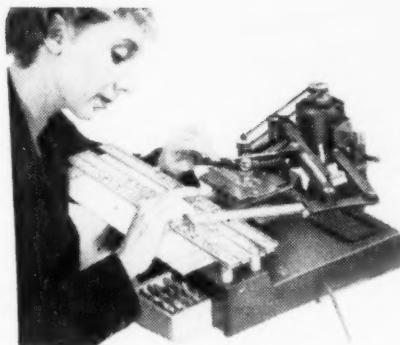
Perfect alignment is assured by the floating ball and socket construction of these pillow blocks. Their rugged construction, heavy load capacity and ability to operate at high speed make them adaptable for a variety of applications now using ball bearings.



Congress Lubralife Bearings are available in both pillow block (illustrated) and flange mountings. Shaft sizes of  $\frac{1}{2}$ ",  $\frac{5}{8}$ ",  $\frac{3}{4}$ " and 1" bores and others can be supplied.

Preliminary tests show that users of Congress Lubralife Bearings should expect a life of from 20,000 to 30,000 hours under normal operating conditions.

For complete information, write to **Congress Drives Division, Tann Corp.**, 3750 E. Outer Drive, Detroit 34, Mich.



So Simple Anyone can  
**ENGRAVE**  
on Plastic and Metal

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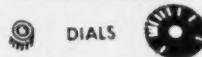
- Multiratio Tracing Arm. Engraves more than 15 sizes from ONE template.
- Covers a larger engraving area than any other portable unit of its kind.
- Ideal for any lettering—serial and part numbers, etc.

Send for Booklet Model 1M—Dept. No. 28

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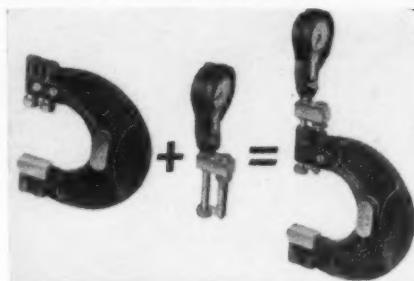
13-19 UNIVERSITY PL. NEW YORK 3, N. Y.

## DIALIZER CONVERTS SNAP GAGES TO DIAL TYPE INSTRUMENTS

An ingenious device which converts ordinary AGD snap gages to dial instruments has recently been introduced by Standard Gage Co., Inc. This unit, known as the Dializer, is inserted in place of two gaging pins of American Gage Design adjustable limit snap gage. Thus, a limit gage can be changed into a dial gage giving quantitative readings at a cost stated by the manufacturer to be far below that of a new dial snap gage.

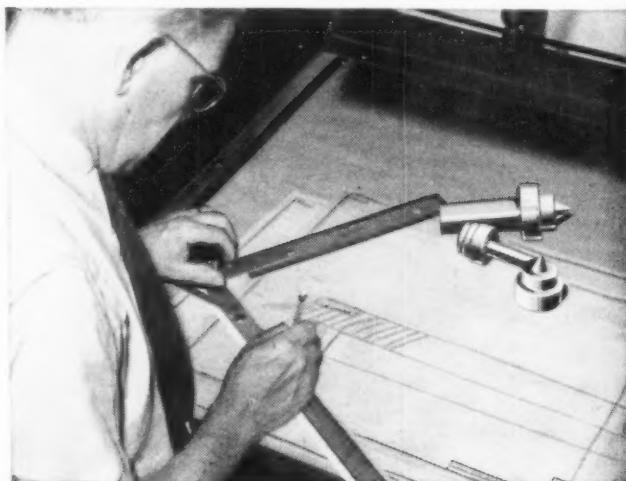
After the Dializer is installed, it is easily adjusted by means of a knurled nut. It may be clamped in final position by the same locking mechanism used originally for one of the gaging pins. After conversion, the gage will have the same range of adjustment as it did before.

The Dializer is at present available for frames No. 1 through No. 6, (checking range up to about 3"). It will go in any model, A, B, or C, and in any make of frame, if in accordance with AGD specifications. Accuracy is assured, according to the maker, by the double reeds by which the movable spindle is supported. The gaging surface is either



flash chrome plated on hardened steel or tungsten carbide. For complete information, write Standard Gage Co., Inc., Poughkeepsie, N. Y.

Appointment of **Phillip D. Cannon** as vice president of Johns-Manville Products Corp., and production manager of the Industrial Products Division has been announced by J. A. O'Brien, vice president of the division.

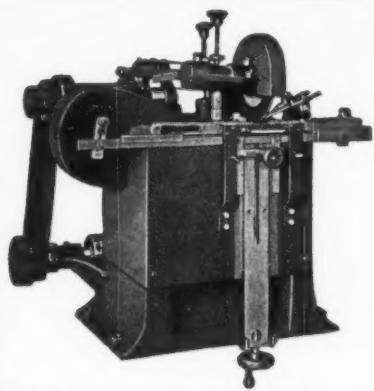


### Engineered Live Centers

the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

A properly designed Live Center is one of

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TOOL COMPANY  
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Wardwell Model EC Combination Grinder. The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

## How to make 10 hack saw blades do the work of 60

Impossible? Not with Wardwell EC Grinder. You can resharpen one gross of hack saw blades at least 6 times on the EC.

The savings possible on one gross of blades saves you enough to pay for the machine. Your old blades actually are given a keener, longer lasting cutting edge, because new blades are usually not ground after hardening.

**WARDWELL MODEL EC COMBINATION  
GRINDER SHARPENS CIRCULAR, HACK  
AND BAND SAW BLADES ON ONE  
MACHINE!**

Special Wardwell wheels will not burn,  
anneal or injure hardness of teeth.

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**MANUFACTURING CO.**

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**RACK'EM and SAVE...**

**SAVE SPACE** Sterling Racks utilize rent-free air space . . . keep your parts and tools neat and orderly.

**SAVE TIME** Materials "filed" in Sterling Racks are always available — upper and lower boxes equally accessible.

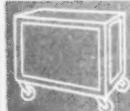
**SAVE MONEY** Sterling Racks cost you about 1 1/3 less per opening than individual racks.



Sterling Racks shown in modern stockroom. These five foot sections are convenient for shipping, assembling, and relocating. Racks are also equipped with Sterling Stacking Boxes.

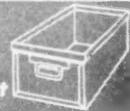
Made to fit your present shop boxes or boxes supplied. Available in five section units of rigid, all-welded construction—Prompt Delivery. Write today for literature and prices.

Sterling Factory Equipment Co., 187 Charles St., Providence, R. I.



# Sterling

Quality Handling & Storage Equipment



### CONTINUOUS FLOW ACETYLENE GENERATOR

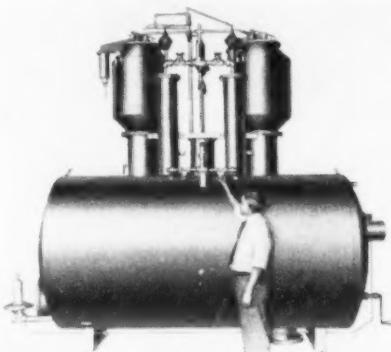
To meet the needs of welding shops and industrial plants for large quantities of acetylene at minimum cost and maintenance, the Sight Feed Generator Company has developed a new stationary type generator known as the Model "A-Twin", that produces a continuous flow of acetylene, and is virtually automatic in its operation. Compactly built to occupy a minimum of space, the new model is designed to supply acetylene to points of usage throughout the plant by pipe line distribution.

The "A-Twin" requires a minimum of attention to keep it producing an uninterrupted flow of acetylene. Once the generator is placed in service, only two simple manual operations are needed: (1) Refill hopper with calcium carbide ( $\frac{1}{4} \times \frac{1}{12}$ ) when empty; (2) Meter the required amount of water into tank. Both jobs can be done simultaneously. To begin operation, both hoppers are filled with carbide. When the supply in one hopper is exhausted, the second hopper automatically goes into service. Shifting of the "load" from one hopper to the other is accomplished by setting the operating pressure of the No. 2 hopper at one pound below the pressure of the No. 1 hopper. After the first hopper has emptied its supply of carbide into the tank and the pressure drops one pound, the second hopper automatically begins to feed its charge of carbide. The first hopper can then be refilled and the cycle repeated.

Other features of the "A-Twin" include a dehydrator rubber throat at the base of each hopper, to maintain dry atmosphere around the carbide feed valve, thus preventing clogging; a flexing device that wipes the splash protector and dehydrator tube clean each time the carbide hopper is refilled; an automatic water

level control that permits the correct amount of residue to be discharged each time the tank is filled with water.

The unit can be operated at any desired pressure up to 13 pounds p.s.i. Since the "A-Twin" is a medium pressure generator, acetylene can be forced through long pipe lines without the use of compressors which would be required with low pressure generators. The "A-Twin"



will be manufactured in five sizes, producing from 500 to 2400 cu. ft. of acetylene per hour. Due to the size of the tanks and the amount of water they contain at all times, overload demands for acetylene can be easily met.

Other extra equipment will include a hopper loader that can be filled at the floor level and hoisted by chain blocks into position over the hopper.

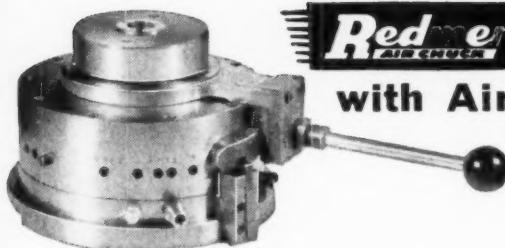
For complete information on the "A-Twin" Acetylene Generator, write **The Sight Feed Generator Co., Dept. BB, West Alexandria, Ohio.**

MICRO DRILL GUIDE  
AND

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Specialists in Bushings with Micro Drill Size Holes, Also Small Hole Drilling —  
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RC-5

**Redmer**  
Index Chuck  
with Air Operated Collet

The REDMER INDEX CHUCK has twelve indexing positions and Collet capacity  $1/16''$  to  $2''$ . REDMER CHUCK can be had with either Index Collets or Standard Brown & Sharpe type collets.

No. FC-28

V-29

### Air Foot Control and Valve

The REDMER FOOT CONTROL & VALVE was developed in order to meet a demand for an AIR VALVE & FOOT CONTROL LOW IN COST but constructed to surpass the high priced Valves.



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GUNTERSVILLE, ALABAMA, BOX 247

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WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

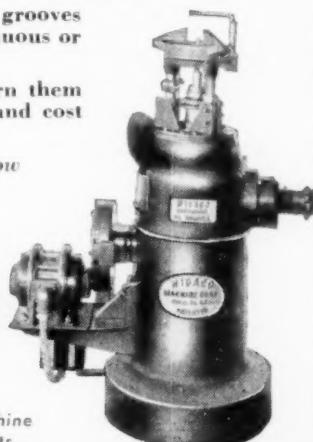
Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

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You Can Improve Your Production.

**WICACO**  
MACHINE CORPORATION

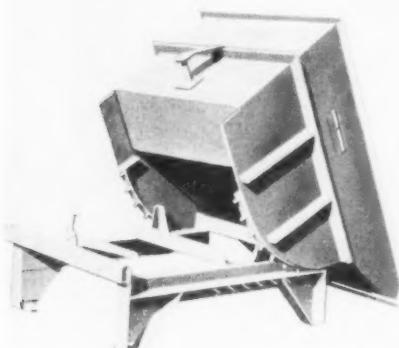
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Manufacturers of  
Precision Machinery and Machine Parts  
Roller Bearing Twister Spindles—Spindle Oiling Machine  
Precision Internal Grinder—Screw Machine Products



### HEAVY DUTY SELF-DUMPING HOPPER

To meet special requirements, Roura Iron Works, Inc. has developed and built for the Buick Motor Division Foundry, at Flint, Michigan, special one cubic yard



capacity heavy-duty self-dumping hoppers. The hopper bodies are built of  $1\frac{1}{2}$ " plate throughout; they are specially designed to withstand warping when handling red hot sprues and castings. This new heavy-duty hopper is built to fit any standard type lift truck and can be unloaded by the truck operator by lifting the patented instant release handle. Other standard Roura Hoppers come in  $1\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{2}$  and 2 cubic yard sizes. They can also be designed for flat trucks and with special flanges to permit stacking.

Further information about the labor savings offered through the use of these units can be obtained by writing **Roura Iron Works, Inc.**, 1407 Woodland Ave., Detroit 11, Mich.

### Get Out Those BROKEN TAPS!

Get 'em out with "WALTON" TAP EXTRACTORS, the inexpensive tools for removing broken taps from all kinds of work. Shop proven; fast; economical. See your jobber, or write us for Folder No. 12 and details of free trial offer.

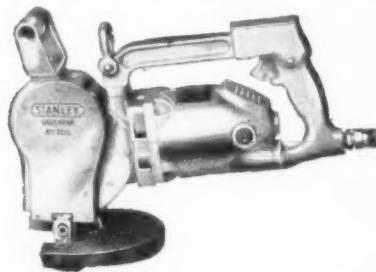
**THE WALTON COMPANY**  
Hartford 10,  
Connecticut

### STANLEY NO. 206 UNISHEAR

Stanley Electric Tools announces the development of the No. 206 Unishear, stated to be an ideal tool for straight cutting of sheets on heavy production jobs as well as for maintenance and repair work. It cuts up to 6 gauge (.203") in mild hot rolled steel, and up to 8 gauge (.171") cold rolled steel, copper, brass, aluminum, lead and other sheet materials in proportion to the hardness of the metals.

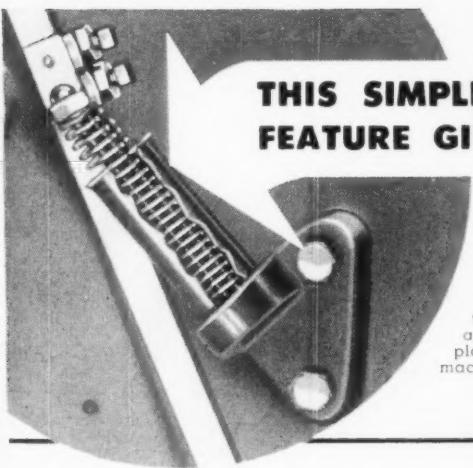
The Unishear cuts up to 5 feet per minute on straight cuts for which it was especially designed, in order to eliminate the moving of large sheets to heavy stationary machines for cutting. The blade motion "feeds in" the work.

The No. 206 Unishear is equipped with a duplex handle to permit gripping at the most convenient position. The universal type motor operates on either d.c. or a. c. at 60 cycles or less; voltages are 115, 230 or 250. The unit is of full ball



bearing construction. It is furnished complete with armored 3-wire rubber covered cable, a forged steel yoke, clearance gages, wrenches, and a supply of lubricant. For complete data, write for catalog sheet No. 50A to **Stanley Electric Tools, Division of The Stanley Works**, 512 Myrtle St., New Britain, Conn.





## THIS SIMPLE, SURE-ACTION FEATURE GIVES EXTRA SAFETY

**JOHNSON** puts the exclusive SAFETY TRIP on all models of Power Presses at no extra cost! This patented non-repeating device uses two springs to hold release lever up. If one fails, the other takes over. If both fail, clutch automatically disengages. Springs replaced in 30 seconds without stopping machine.

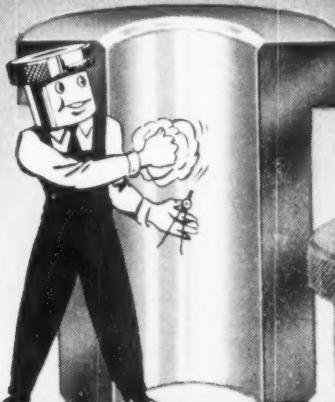
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MACHINE  
and PRESS CORP.

620 W. INDIANA AVE. • ELKHART, IND.

IF YOU THINK SAFETY FIRST, think first of Johnson. Write for information on 8 models of open-back inclinable Power Presses now available. Ask about the new extra capacity, extra power No. 55 Press.

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FOR PERFECT ALIGNMENT  
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# AMERICAN DRILL JIG BUSHINGS

SAVE YOU MONEY

Send for catalog and name  
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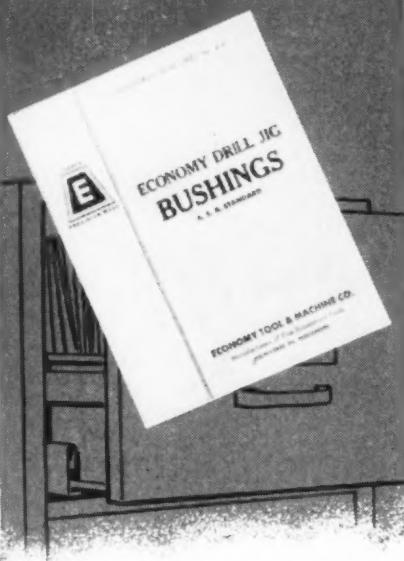
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Also quickly available:  
new gages and gages salvaged  
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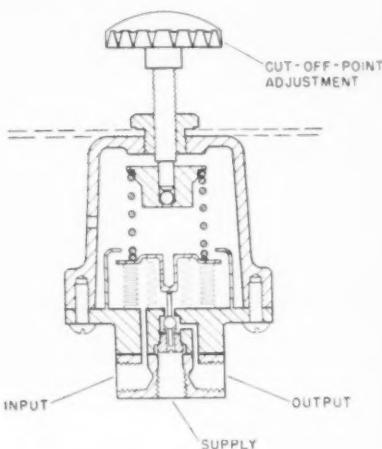
**Economy**  
**TOOL & MACHINE CO.**

1829 S. 68th St., Milwaukee 14, Wis.

## PNEUMATIC RELAY FOR AIR-ELECTRIC SWITCHES

Moore Products Co. announces the development of a pneumatic relay for use with air-electric switches and other equipment requiring accurate, high-speed operation.

The relay provides sharp cut-off action. The cut-off point can be set for any pressure between zero and 35 p.s.i. Overloading with input pressures up to 70 p.s.i. will not damage the instrument. Supply pressures as high as 50 p.s.i. may be used. The design provides a high amplifying ratio, so that even a small change in input pressure results in a full change in output.



This new relay has been used in connection with the Moore Air Gage, to operate signal lights or sorting mechanisms. When used with a high magnification type Moore Pneumatic Comparator Gage (.0004" full scale) and a commercial pressure switch, this relay will operate a signal light on a dimensional change as small as two millionths of an inch.

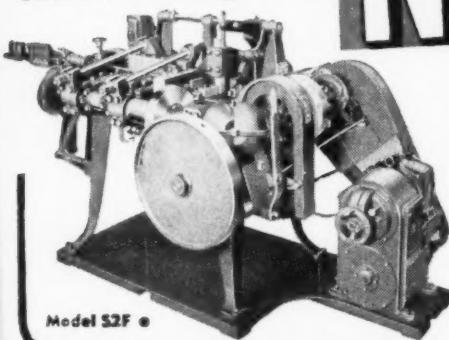
Tests on repeating accuracy have shown that this relay operates, after 8½ million cycles, with a deviation of only 2 to 4 millionths.

Standard instruments are furnished for direct action; that is, an increase of input pressure causes an increase of output pressure. Special instruments for reverse action may be furnished. Further data is available upon request.  
**Moore Products Co., H & Lycoming Sts., Philadelphia 24, Pa.**

**There's Nothing like a**

# **NILSON**

*for  
Rapid Production*



Model S2F •

**A. H. NILSON MACHINE CO.**  
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SPECIALISTS IN WIRE FORMING EQUIPMENT FOR OVER 50 YEARS

Automatic Wire and Metal Forming Machines • Staple Forming Machines • Chain Making Machinery • Foot and Power Presses • Wire Reels • Wire Straighteners.

## **A 100 POUND GIANT NEW AS NEW CAN BE**

Never has there been a machine to equal this Marschke Swing Belt Machine for honest-to-goodness "light-weight" grinding and a lot of polishing jobs. Weighs only 100 pounds . . . yet produces a volume of sparks that proves the work it does. What work? For



weld seam, spot weld and burr cutting — it's a honey. For removing runs, dirt particles, air bubbles and other finish blemishes — it's a lulu.

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Well balanced . . . maneuverable . . . handy . . . easily manipulated. You ought to see the pictures showing its versatility . . . get the details on this "little giant".

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**Super Finish Bore on  
Universal Drill Bush-  
ings Lengthens  
Bushing Life,  
Reduces  
Tool Breakage**



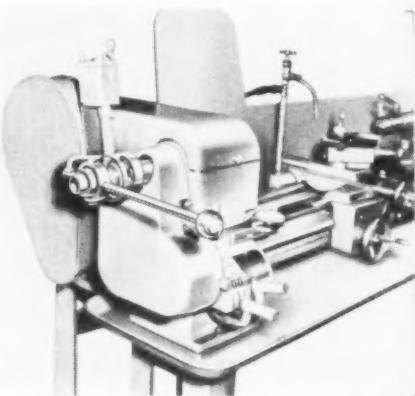
To super finish I. D., add such plus features as blended radius, knurled head, I. D. break, chamfered O. D., and you have the reasons why Universal Drill Bushings are specified by many of America's leading manufacturers. Universal provides extra prompt sectional delivery and information from warehouses at 1060 Broad Street, Newark, N. J., and 5035 Sixth Ave., Kenosha, Wis. Write, call or wire today!

**UNIVERSAL  
ENGINEERING COMPANY**  
FRANKENMUTH 10, MICHIGAN

## **WALTCO COLLET ATTACHMENT FOR 1 3/8" LATHES**

Bell Equipment Company announces the Waltco quick-opening and closing collet attachment, for which it is exclusive national distributor.

This Collet Attachment was developed to fill a need for an efficient production type collet attachment with a one-inch collet capacity for the 1 $\frac{3}{8}$ " hole-in-spindle lathes; it was engineered and developed in close conjunction with actual production methods and requirements.



The attachment is rugged, as the cam spool and fingers are designed to give a vise-like holding power with a minimum of pressure on the actuating lever. All necessary parts are of alloy steel, heat treated for strength and long wear qualities.

The attachment is adaptable and can be installed on any lathe in a moment without disconnecting the gear guard.

It is an efficient unit, since the easy operating, yet positive adjusting mechanism is built inside the outer diameter leaving no protruding knobs to catch clothing or cause operator injury.

The attachment is so designed that at all spindle speeds the stock will be free in the open position. This is a noteworthy feature, in that some finger type closers will drag at high speeds.

This Production Collet Attachment will fit the new 11" Logan, South Bend Clausing, Sheldon, or any lathe with 1 $\frac{3}{8}$ " hole-in-spindle. For complete information, write **Bell Equipment Co.**, 5212 Santa Fe Ave., Los Angeles 11, Calif.

Acme Offers Complete Facilities for All Types of

# PRECISION GRINDING

FAST SERVICE... EXPERT WORKMANSHIP... LOW COST

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Acme is equipped to handle all types of precision grinding. Expert craftsmen, using newest methods and modern equipment, will do the job for you faster, better, more economically. Acme also offers a flat lapping service that can finish surfaces to within millionths. Write for details.

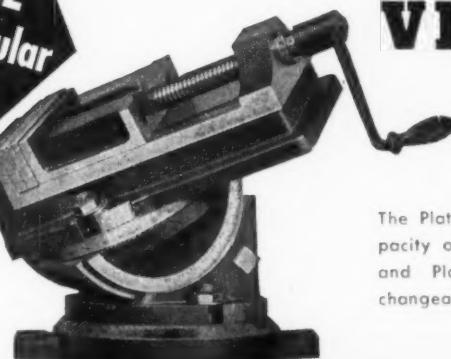
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Makers of Standardized Jig & Fixture Bushings  
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### Multi-Swivel VISE



Fully universal . . .  
three swivels simplify  
the setting of com-  
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terchangeable . . . can  
be used as a plain  
flanged vise, a swivel vise  
or multi-swivel vise.

#### MASTER TOOLS

The Platen increases ca-  
pacity of the unit. Vise  
and Platen are inter-  
changeable.

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80 BATTERY MARCH ST.

BOSTON, MASS.



**is the ONLY Center  
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OVERLOAD INDICATOR**

**Look for the RED BAND**

You no longer have to guess whether you are overloading your live center thrust bearings if you use MOTOR TOOL LIVE CENTERS. When the load is too great the RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the RED BAND is visible you are running COOL and SAFE.

*Send for*

NEW descriptive folder . . . and verified case histories of how MOTOR TOOL LIVE CENTERS have out-performed and outlasted ALL other centers on exceedingly tough, continuous-run jobs.

**MOTOR TOOL MFG.CO.**  
8663 DAYTON ST. DETROIT 10, MICH. PHONE OH-0343

Make it a Rule  
to Call Motor Tool

#### CHRONOLOG INC. GOES NATIONAL WITH NEW PRODUCTION CONTROL DEVICE

Chronolog Inc., for the past three years the sales and service specialists for the state of Michigan, have met with such success as to warrant their appointment as country-wide representatives for a new Model C-1 Chronolog by its manufacturers, The National Acme Company of Cleveland.

The Chronolog is a patented electrically operated unit which produces a printed record of machine productivity and idle time, and a count of the work produced; it shows when, how long and for what cause the idle time has occurred. It performs the valuable service as a "mechanical secretary", eliminates alibis, and guesswork. Being entirely impersonal, the Chronolog System is welcomed by operators, labor union officials and management alike, thus improving labor relations.

This system of production control is said to have found quickest acceptance in plants where standards are already high, where intelligent consideration has been given to lowering production costs.



Surveys in ten major industrial locations, plus the fact that the new Model C-1 Chronolog, illustrated above, consistently shows savings of 10 to 25%, has warranted Chronolog Inc. appointment and training of sales and service personnel capable of on-the-ground recommendations for every type of production equipment that is subject to interruptions. For further details concerning the Chronolog, write **The National Acme Co.**, 170 East 131st St., Cleveland 8, Ohio.

## NEW Pioneer Foot Switch SAVES TIME!

Allows machine operators freedom of both hands. Model FS-50 shown is momentary contact type, has BX clamp, is rated 12A-125V or 6A-250V, AC-DC. Other ratings, models available — also special switches made. Send "specs", requirements, for quantity discounts.

**PIONEER PATENTS & PRODUCTS CO.**  
Dept. B - 25 N. Franklin St. - Chicago 6, Ill.



## CYLINDRICAL SUB-PRESSES

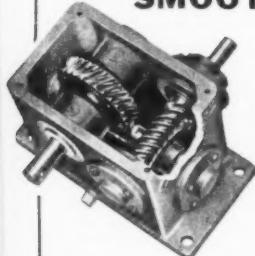
Dies for high precision work should not only be perfectly aligned but provision should be made to maintain that alignment throughout the life of the die. Our bulletin shows how it can be done.

**WALTHAM MACHINE WORKS** Waltham 54, Mass.



ARCH SUB-PRESS

**SMOOTH as the oil they run in!**



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**SPEED REDUCER**

Write for catalog containing handy engineering data.

**ABART GEAR & MACHINE CO.**  
4832 W. 16th St. Chicago 50, Ill.

Precision-built of strongest bronze and hardened steel, Abart Speed Reducers run smoother, last longer. More than 75 types and sizes in spur, worm, or combination—150 to 417 HP—ratios up to 10,000 to 1.

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USING STANDARD PARTS — ONE WEEK SERVICE  
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311 S., TROY EST. 1926 ROYAL OAK, MICHIGAN

### COMBINATION PIPE VISE AND C-CLAMP

A specially designed malleable iron clamp provided with heat-treated steel pipe jaws, combining the properties of four useful tools in one frame, has recently been introduced by Charles Clamp Co. As a vise or C-clamp, the device, with a jaw opening of  $3\frac{3}{4}$ " and a face of  $1\frac{1}{2}$ ", has wide usage throughout the average shop.



When the vise is bolted to a bench and two jaws are removed, the unit becomes a pipe vise. When the bolts are removed, the device is converted to a sturdy C-clamp with vise-type handles and a ball and socket swivel. As a pipe wrench and C-clamp, the unit is applicable to a wide field of work. The wrench holds pipe up to  $1\frac{1}{2}$ " in diameter. The new vise may be also adapted to a simple clamp, since it will handle the wide variety of work which requires maximum strength without excessive weight. The sturdy I-beam section has a capacity of  $3\frac{3}{4}$ ", a  $5\frac{1}{8}$ " screw, 3" depth of throat, yet the weight is only 3 lbs. The Pipe Vise Clamp has a strength of 50,000 lbs., p.s.i.,

a yield strength of 32,500 lbs., p.s.i., and an elongation in 2" of 10%. For complete data on this useful tool, write **Charles Clamp Co.**, 756 Fourth Ave., Aurora, Ill.

### SMOKE DENSITY INDICATOR

The Photoswitch Excess Smoke Indicator, Type 2A10C, gives a continuous indication to the boiler room of the condition of the gases which are passing through the flue, signalling when either smoke or air are sufficiently excessive to cause inefficient combustion or create a smoke nuisance. It is designed for use in factories, power plants, and all types of institutions. It provides an overall check of combustion efficiency, introducing impersonal precision into power plant operation.

The unit consists of a photoelectric control light source and densometer. The photoelectric control includes a phototube and electronic amplifier which operate a dual relay system and indicating meter in the densometer. The photoelectric control and light source are mounted on opposite sides of the flue or mounted on opposite sides of the flue. The beam from the light source projects from an opening in the flue to the eye of the control. The densometer is located on the boiler room instrument panel board.

A tamper-proof sensitivity adjustment on the photoelectric control is set upon installation to compensate for flue dimensions and other variables.

The equipment incorporates advanced electronic circuit design. Emphasis has been placed upon simplicity of construction, resulting in negligible maintenance. All equipment is of rugged construction supplied in dust-proof housings.

Send for Bulletin No. PE-4710 to **Photoswitch Inc.**, 77 Broadway, Cambridge 42, Mass.

### USE "NIROL" LIVE CENTERS—HERE'S WHY:

It's a rugged, simplified designed precision live center permitting perfect support of all loads and thrusts. Reduced overhang adds rigidity and increases machine capacity. Compensating factor provided for work expansion from heat while machining. Has met with hearty approval of all machinists and shop men wherever used.

#### Morse Taper Sizes:

No. 2	\$21.75
No. 3	26.75
No. 4	32.50
No. 5	49.75

Other sizes and  
prices upon request



Patent Applied for

**L. F. TREICHLER—PRECISION GRINDING**  
900 ROUTE 29

Increase  
Production  
  
SAVE TIME  
  
SAVE MONEY

# Shuregrip... BORING BARS



## DOUBLE END 30° & 90°

When Ordering — State Angle Required

Number	1-A	2-A	3-A	4-A	5-A	6-A	7-A
Bar. Dia. In	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Length In	7	8	9	11	13	18	23
Cutter In	$\frac{1}{8}$ Rd.	$\frac{1}{4}$ Rd.	$\frac{3}{16}$ Sq.	$\frac{1}{4}$ Sq.	$\frac{5}{32}$ Sq.	$\frac{3}{16}$ Sq.	$\frac{1}{2}$ Sq.
Price Each	.50	1.60	2.25	2.50	3.50	8.25	16.00

WRITE FOR PRICE ON LARGER BARS

## SINGLE END 30° & 90°

Number	1-B	2-B	3-B	4-B	5-B	6-B
Bar. Dia. In	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{7}{8}$
Length In	3	4	5	7	8	10
Cutter In	$\frac{1}{8}$ Rd.	$\frac{1}{4}$ Rd.	$\frac{3}{16}$ Sq.	$\frac{1}{4}$ Sq.	$\frac{5}{32}$ Sq.	$\frac{3}{16}$ Sq.
Price Each	.80	.90	1.35	1.60	1.80	2.00

Break Off On Score, As Required

1—6" LENGTH —  $\frac{1}{8}$  DIAMETER H.S.S. TOOL BIT STOCK — HARDENED — EACH 70c.  
1—6" LENGTH —  $\frac{1}{8}$  DIAMETER H.S.S. TOOL BIT STOCK — HARDENED — EACH 80c.  
ROUND TOOL BITS FURNISHED IN 1-A — 2-A — 1-B AND 2-B — ALL OTHERS SQUARE.

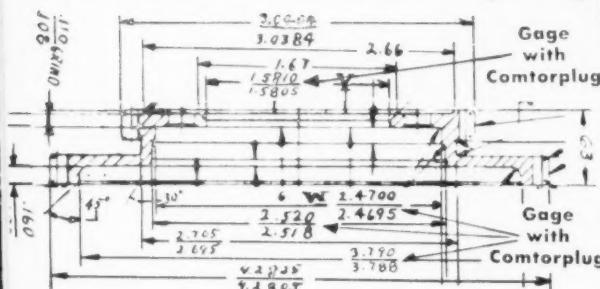
1 HEXAGON WRENCH FURNISHED WITH EACH BAR.

PRICE OF SQUARE H.S.S. CUTTER BITS.       $\frac{3}{16} \times 1\frac{1}{4}$        $\frac{5}{16} \times 1\frac{1}{2}$        $\frac{3}{8} \times 1\frac{1}{8}$   
.15      .20      .30      .50

J. E. FREYMAN & SONS, INC.

3627 KESWICK ROAD  
BALTIMORE 11, MD.

A "toughie" to gage — but  
EASY with Comtorplug



COMTOR CO. 62 Farwell Street  
Waltham 54, Mass.



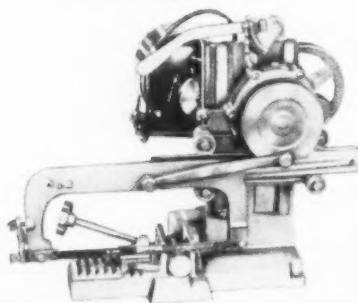
Patented Comtorplug makes all internal gaging easy. Automatic features assure true 2-point contact, at any part of hole. Shows actual size (not a passing reading), front or back taper, out-of-round, etc. Gages shallow holes or to bottom of deep blind holes.

REQUEST BULLETIN 40

# STANDARD

## high speed hacksaw

BENCH MODEL No. 2



- 1. LIFT on return stroke by simple lever pressing against smooth track (no teeth to wear).
- 2. BALL BEARING GUIDES reduce friction.
- 3. AUTOMATIC SWITCH stops motor at any desired depth of cut.
- 4. ANGLE CUTTING by turning saw instead of work.
- 5. ACCURACY. Rigid construction permits cutting thin tool steel disc, etc.
- 6. PORTABLE. No. 2 saw may easily be moved to work and set on floor.

(Number 2 Model also available with floor stand.)

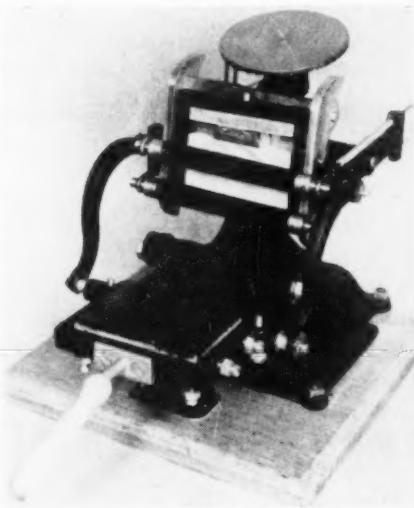
Another popular model is our  
NUMBER 3 STANDARD FLOOR MODEL.  
6" x 6" WET CUT COMPLETE WITH  
COOLANT PUMP AND RESERVOIR.

WRITE FOR BROCHURE No. 150 . . .

Dealer franchises available some sections

### MACHINE IMPRINTS ON PLASTIC, GLASS, METAL

A hand-operated, off-set machine, made by the Apex Machine Manufacturing Corp., will print illustrations, trade marks, trade names and advertising matter on pens, pencils, lighters and other items. The manufacturer states that this new machine will print in any color on almost all non-porous surfaces, round, flat, concave or convex. Using type, cuts or electros, the Apex machine will print an area up to 3" x 4½" at the rate of 500-800 pieces an hour.



The Apex machine prints by the transfer process. By merely pulling the hand lever forward and returning to position, the type is automatically inked and an impression is made on the off-set transfer pad. The printed matter is picked up by the item from the transfer pad by pressing the item against the pad, or by rolling the item over the pad by hand. The Apex Corporation supplies the off-set type. For reproducing pictures, trade marks, etc., cuts, printing line cuts or electros are used. All ink colors are available from the company, in addition to a variety of inks, rollers, type and special parts for special purposes.

The company manufactures an extensive line of printing and embossing machines. Further information may be obtained by writing to the **Apex Machine Manufacturing Corp.**, 53 East 10th St., New York 3, N. Y.

**STANDARD TRANSMISSION  
EQUIPMENT COMPANY**  
70 W. UNION ST. PASADENA 1, CALIF.

# PRECISION DRILLING

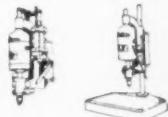
.004 to  $\frac{1}{2}$ "

- ★ Fingertip Variable Speed
- ★ Sensitive Precision Spindle
- ★ Quick-set Drill Depth Stop
- ★ Built-in Ball Bearing Motor
- ★ 16" Model 300 to 5,000 RPM

## 8" HIGH SPEED SMALL HOLE DRILLING .004-.156"

Speed-Right Manual and air feed drilling machines feature controlled uniform spindle speeds 1,000-10,000, 2,500-15,000 R.P.M.

Priced from \$124 complete.



Speed-Right Model 601

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## Automatic Cam Actuated Brake

OF

### PRESS-RITE POWER PRESSES

STOP . . . the press automatically at "top center" with a brake that is cam actuated. Braking power is adjusted by the same simple conventional method used in ordinary constant drag brakes and can be instantly set to compensate for various weights of dies used. With cam actuation, constant drag is eliminated and full motor power is utilized to turn out more work at lower cost. Other cost cutting features of Press-Rite Presses include:

- Exclusive non-repeat safety mechanism
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- Heavy duty reinforced frame

See them at your dealer today.

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**6 MODELS**  
5 to 30 ton cap.

**Sales Service Machine Tool Co.**



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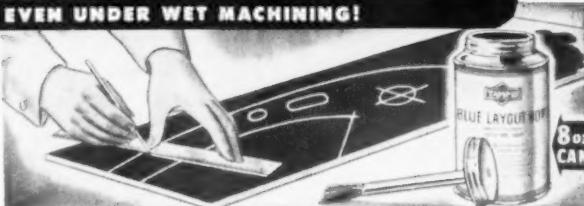
MACHINISTS — TOOL AND DIE MEN — SHEET METAL WORKERS — ETC.

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STAYS PUT EVEN UNDER WET MACHINING!

Speeds layout on all metals.  
Dries fast. Oil resistant. Won't  
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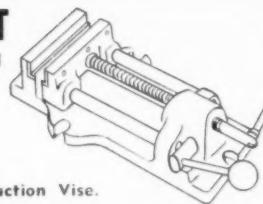
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All Purpose Tool Room and  
Machine Shop Vises.

### The JAWSET

Adjustable Pressure Production Vise.



For Information Write Dept. M

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These indispensable handymen of the shop shear and nibble (outside and inside) up to  $\frac{1}{16}$ " flat stock; openings for cutting  $\frac{1}{16}$ ",  $\frac{1}{14}$ ",  $\frac{5}{16}$ ",  $\frac{3}{8}$ " rods. No. 5 also punches up to  $\frac{1}{2}$ " holes in  $\frac{1}{8}$ " stock. No. 4 available for bench or vise mounting; No. 5 standard or swivel bench mounted. Write for full details or ask your dealer for a demonstration.

NATIONAL MACHINE TOOL CO.  
DEPT. 100-E • RACINE, WISCONSIN

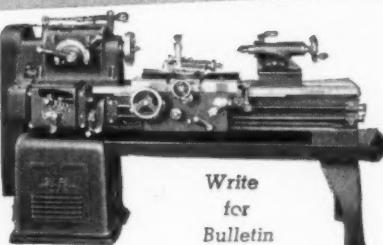


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12 Speed Geared Head  
Motor Drive Timken Mounted  
Spindle.

Modern Design —  
Liberal Dimensions.

Carroll & Jamieson Machine Tool Co.  
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THE VALVE WITH  
THE INTERNAL  
FULCRUM LEVER

FOR AIR AND FLUIDS



### AIRGUNS

For blowing chips from work—  
For cleaning out hollow sets,  
machine recesses and tee  
slots — For drying parts before  
inspection and for many  
similar uses, Air-O-chek is  
the Airgun.

The internal fulcrumed lever is a basic design in all Air-O-chek  
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### SPRAYGUNS

For doing innumerable types  
of spray work where the li-  
quid is under pressure Air-O-  
chek fills a need. Valve has  
quick stop-start action. Nozzle  
generates fine cone spray.  
Streamlined.

**AIR-WAY PUMP & EQUIPMENT CO.**

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**The Quick, Easy, Handy Way  
to TAP BY HAND**

Adapts for LATHE USE

THE DAHLSTROM TAP GUIDE virtually eliminates tap breakage—and saves those costly hours spent prying broken taps out of dies. Saves time, too. Just a few turns of the handle and the job is done.

Winds through continuously, with no backoff. Work is always dependably straight and square. Fasten it to a post or set it on top of a big job. This handy tapper comes equipped with 9 adaptors, 8-32 to 3/4" but taps are not furnished. Spindle can be pulled out and used in a lathe, or used as tap extension for hard-to-get-at-places. 13" x 8" x 14", wt. 32 lbs. \$52.50 F.O.B. St. Paul. DAHLSTROM MFG. CO., 2506 WEST LARPENTEUR AVE., ST PAUL 8, MINN. Send for Free Circular.

Also Makers of Dahlstrom Autostop and Tap Chuck

**Dahlstrom TAP GUIDE**

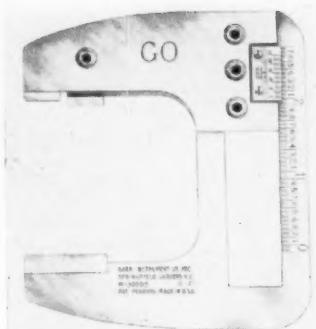
\$52.50  
F. O. B.  
St. Paul

### BARR SELF-SETTING SNAP GAGES

A new line of rapid self-setting, wide range Snap Gages has recently been introduced by Barr Instrument Co., Inc. These ingenious precision measuring devices have been designed both for production work and for the individual machinist. The readings are calibrated in ".001". The "Go" and "No Go" members, as well as the frame, are fabricated of fine, light weight, alloy steel, polished to natural bright finish. The hardened anvils are  $\frac{3}{8}$ " wide and are aligned. The frame of the instrument is  $\frac{3}{8}$ " thick. The gages are guaranteed by the manufacturer for performance and accuracy.

To set the gages, the operator or inspector moves the "No Go" member to the desired Vernier reading, then moves the "Go" member to the known Vernier setting. The center screw is then turned with an Allen key until very slight pressure is felt; this is repeated with the upper and lower screws. The center screw is then turned to maximum tightness, followed by the upper and lower screws. The gage is now set to the limits of desired measurement.

The Barr Snap Gages are supplied in six models, either with or without engraved scales; ranges are from 0 to 1" on



the smallest, to 3"-6" on the largest model. For complete information, write **Barr Instrument Co., Inc.**, 134-39 225th St., Springfield Gardens 13, N. Y.

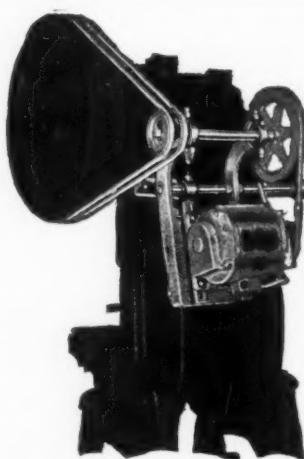
### NUMBERING AND LETTERING PRESS WITH AUTOMATIC SPACER

A new Numbering and Lettering Press, designated as Model 48, has recently been announced by Numberall Stamp & Tool

Company. The new unit is provided with a fully automatic spacer which advances automatically one space with each

## Modern MOTOR DRIVES FOR EVERY TYPE OF MACHINE TOOL & PUNCH ... PRESS ...

Zip up production by gaining the advantages of independent Drives. The MODERN Drive using quiet, trouble-free V-Belts saves on power and eliminates the hazards and maintenance of line shafting. MODERN Drives are inexpensive — easy to install — will outlast the equipment they are mounted on. (Send today for full information on how you can cut costs and increase production. No obligation — but write today.)



MODERN MOTOR DRIVES DIVISION OF { NICHOLS  
3818 W. GRAND AVE. ENGINEERING CO.  
CHICAGO 51, ILLINOIS

impression. Character sizes of  $1/16"$ ,  $3/32"$  and  $1/8"$  can be furnished with the Model 48. The dial size is  $3\frac{1}{4}$ " in diameter. Net weight of the machine is 15 lbs.

Plates up to  $2\frac{1}{2}" \times 3\frac{1}{2}"$  can be stamped. The dial is made of high grade steel, scientifically hardened and tempered. Af-



ter reaching the end of a line, the operator depresses the shank slightly and moves the table back to the starting point. The depth of impression of the unit is adjustable. For complete data, write for Bulletin BB 48 to Numberall Stamp & Tool Co., Huguenot Park, Staten Island 12, N.Y.

#### SMALL ACCURATE HARDNESS TESTER

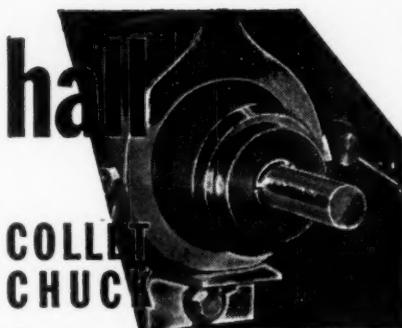
Metalometer is the name of a new pocket size surface hardness testing instrument introduced by Peabody Industries, Inc.

With quality control of materials an industrial must, the Metalometer, of new patented design and precision-checked, brings shop-wide quality control at a new



low cost in the metal working industries, and to the many mechanics and machinists who use their own tools.

The device is simple in operation, and is designed so that any one in a shop may use it. In operation, the instrument is placed on the surface to be checked, a



SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

2-inch capacity, \$145; 3-inch capacity, \$295;  
1-inch capacity, \$95

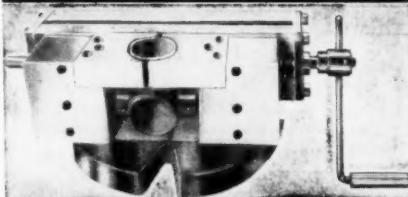
Round, square or hex collets, plain-serrated  
**HALL MANUFACTURING COMPANY**  
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Over 350 Manufacturers Use  
**"JOHN'S" DRILL JIGS**

Many Plants With 40 To 50  
In Constant Use

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To Be Without One  
?

**INVESTIGATE**



Write To  
**HEUSER MFG. CO.**  
1638 N. Paulina St. Chicago 22, Ill.

hammer is released, and accurate readings are instantly available.

The Metalometer has been laboratory-tested for instant, accurate readings on any of the three standard scales—Brinell, Rockwell B and Rockwell C. Readings are guaranteed accurate well within commercial hardness limits. The Metalometer is rugged, with no wearing parts that will affect accuracy of operation; it is designed to permit years of constant use. It will not mar the surface being tested, which is an important factor where costly dies, plated finishes, etc., are involved.

A blanket six-month replacement guarantee against defective materials and workmanship is provided. Descriptive folder is available on request. **Peabody Industries, Inc.**, Dept. BB, 1863 Penobscot Bldg., Detroit 26, Mich.

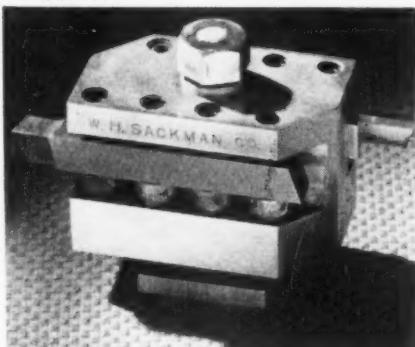
#### NEW RIGID LATHE TOOL HOLDER

A revolutionary design in a tool holder for lathes (patent applied for) has been announced. The new device accomplishes difficult assignments in holding rigid wide tools on comparatively narrow bases with complete absence of chatter.

The holder can mount two tools, and by swinging end for end, all lathe operations such as threading, forming, cut-

ting-off, etc., can be performed.

The secret of rigidity is a series of adjustable posts, accommodating tools of different sizes and permitting further adjustment as the tool wears and is resharpened.



Two popular sizes are in production for use on 9" to 16" lathes. Larger sizes can be made easily to accommodate special needs. For complete information, write: **W. H. Sackman Co., Inc.**, 44 N. Fourth St., Philadelphia 6, Pa.

## YOU PROFIT on every job you send to Rutland!



Rutland reworked or repaired cutting tools are guaranteed to give new tool performance—at a fraction of the new tool cost.

Recutting • repairing • replacing Carbide tips.  
Special tools from obsolete or standard tools, etc.

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## R E I D SURFACE GRINDERS

10,000 IN USE

THEY HAD TO BE GOOD  
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Established 50 Years

**REID BROTHERS CO., Inc.**  
**BEVERLY, MASS.**



**Over 40  
FORD CARBIDE CUTTER SHAPES**

## FORD

### CARBIDE ROTARY CUTTERS — MACHINE GROUND

For filing, grinding and finishing, burring, counter-sinking and chamfering, light milling, profiling, tool, die and mold machining, Ford carbide cutters will do a better job in less time at a lower cost—and without a major capital investment. Send for Bulletin C-649 - Sizes and Specifications.

M. A.

**FORD**  
Davenport 6, Iowa

MFG.  
CO.,  
INC.

## STERLING DRILL GRINDER



### CAPACITY:

3/8" to 2 1/2" drills.  
5" x 9" adjustable table.

MOTOR: 1/2 hp,  
3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

**McDONOUGH MANUFACTURING CO.**  
EAU CLAIRE, WISCONSIN, U. S. A.



## Universal Stock Reel

The Humm Universal Stock Reel is an essential device for the handling and feeding of coil stock to Power Presses.

1. Adjustable Reel to fit various sizes of coil.
  2. Reel is adjustable to suit height of Press.
  3. Reel can be inclined to any position.
- Stock Reel with plain bearing \$55.00  
Stock Reel with roller bearing \$65.00

Manufactured By

**John Humm Safety Equipment Co.**  
253 SHEFFIELD AVE., BROOKLYN 7, N. Y.

## AUTOMATIC CHUCKING AND INDEXING FIXTURE



- 1.—1800 light cuts per hour.
  - 2.—Either horizontal or vertical position.
  - 3.—Collets changed instantly.
  - 4.—Automatically knocks piece out.
- Model D—Ratchet indexing only—1" cap.  
Model E—Both degree and ratchet indexing  
—Capacity up to 1".

Model F—Both degree and ratchet indexing  
—Capacity up to 2 1/4".

Write for Folders

J. W. DEARBORN • Ansonia, Conn.

### OLSEN TESTING MACHINE HAS DUAL CAPACITY RANGE

Recognizing the needs of industry for an up-to-date, compact testing machine which would be both practical and convenient for adaptation to a wide variety of testing problems, Tinius Olsen Testing Machine Company has designed and introduced the new LC Testing Machine. This unit is provided with dual capacity ranges of 10,000 lbs. and 1,000 lbs. It can be used for standard tensile, compression and transverse tests of metals, utilizing the necessary testing tools, as well as for making tests on plywood, bricks, cement briquettes, spot welds, rivets, insulating materials, plastics, and other substances.

The LC Type Testing Machine is guaranteed to meet Army, Navy, Federal and A.S.T.M. accuracy specifications; it is simple in design and operation, and is stated to be supplementing precision testing equipment in many laboratories and shops for production and quality control testing.

Bench models of the unit are hand operated. Motor powered units are provided with stands which house the electrical controls. Complete specifications and data are given in 4-page Bulletin



No. 41, available upon request to **Tinius Olsen Testing Machine Co., Maple Ave., Willow Grove, Pa.**

## PLAY SAFE with GUIDE POSTS!

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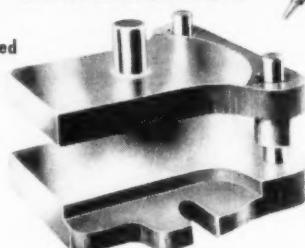


### Anti-Scoring LUBRICANT

—The SURE way to prevent ruined equipment and costly delays!

Non-corrosive and highly concentrated to withstand pressures greater than 50,000 lbs. per square inch. CMD lubricant gives your guide posts the best anti-scoring protection available. Safe. Economical. Prevents all metal-to-metal contact. Stays "put"—protects longer, reducing wear on moving parts.

Write for FREE SAMPLES and catalog, Dept. 5B

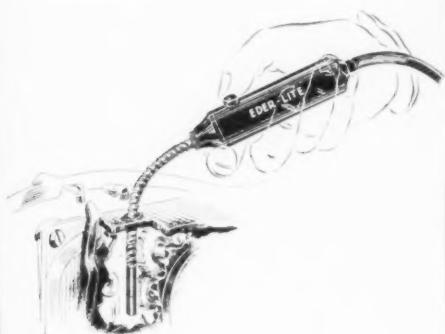


Available as oil or grease.  
Packed in 4 oz. tubes, 1  
and 5 gallon cans, and 55  
gallon drums.

**CHICAGO MANUFACTURING & DISTRIBUTING CO.**  
**1928 WEST 46th STREET**      **CHICAGO 9, ILLINOIS**

### EDER-LITE INSPECTION LAMPS

A useful new miniature inspection lamp, the Eder-Lite, has recently been introduced by Eder Instrument Company. This ingenious device delivers light exactly where it is needed, free of glare, thus facilitating better and clearer vision. The small tungsten bulbs with which the lamps are equipped, are housed either in protective metal tubing or metal reflectors, protecting the bulbs from breakage while eliminating glare and the effects of eye strain.



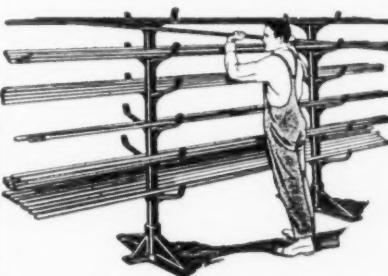
By using hinged mirrors attached to rods, the illumination provided by the miniature bulbs of these lamps gives adequate vision around corners and curves. Accomplishing such illumination without employing excessive light facilitates clearer vision and eliminates eye strain. A larger volume of more accurate inspection will result and defects will be detected before a part under inspection is too far advanced along the production line.

The unit operates on a.c. current and is entirely free from danger of electrical shock. It is equipped with both six and ten-inch rigid and flexible extensions (longer lengths available), facilitating placing light exactly where it is wanted. The Eder-Lite is provided with sturdy miniature tungsten bulbs, either recess or reflector mounted for protection against breakage and reflection of the light; also with precision ground bull's eye lens for concentrating and projecting the light. A push-button type built-in switch is standard equipment. The unit is light in weight and simple in construction; it requires no batteries. For complete details, write for Bulletin No. 101 to **Harmon and Company, Dept. BB, 919 N. Michigan Ave., Chicago 11, Ill.**



### HOW YOU CAN BOOST YOUR PROFITS

The **BROWN TIME-SAVING RACK** saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



Any time you require additional storage space, all you need do is to add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil.

SEND FOR BULLETIN No. 26-B DESCRIBING THE **BROWN TIME-SAVING RACK**.

**BROWN ENGINEERING CO.**

126 N. THIRD ST. READING, PA.  
RACKS • VISSES • CLUTCHES • COUPLINGS

## JOHNSON ROTARY WORK ALIGNER



### SPECIFICATIONS:

MODEL S RA-1, RA-2

5'-10", bed."

MODEL S RA-3, RA-4

11'-6", bed."

Work may be extended beyond ends of bed.

ALL MODELS HANDLE WORK

MATERIAL FROM 1" TO 24" DIAMETER

LOAD CAPACITY 1500 lbs. (All Models)

Save time and trouble handling materials requiring rotation in Manufacture, Assembly, Welding or Repair.

Insures perfect alignment of two or more units. Eliminates expensive set ups for miscellaneous jobs. Adapted to centered or uncentered work.

Checks alignment or run-out on any circular materials.

Tubing, shafting, etc. is easily rotated for uniform welding, joining, cutting, or welding fittings or flanges.

A precision tool of finest material and workmanship. Simple, Durable. Write today for complete description.

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DURANT . . .

LOW FIRST COST

ECONOMICAL OPERATION

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DURANT SCRAP CHOPPER



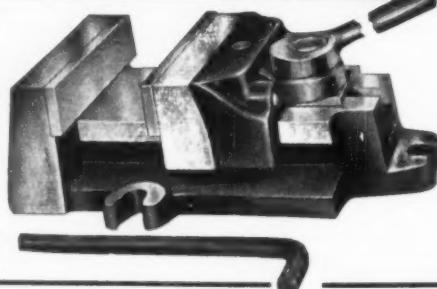
SCRAP CHOPPER

EASY INSTALLATION

FITS ANY POWER PRESS

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PLUNKET QUICK ACTION VISE  
for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws.

Eccentric motion moves jaw 5/16".

Net Price

6" jaws, 1 1/2" deep, opens 4".....\$63.00

Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses,

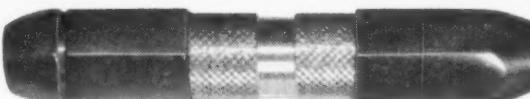
Milling Machines, Shapers, Grinders

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J. E. Plunket Machine Co., 1823 W. Lake St.  
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PIN GAGE  
HANDLE

(Bushings for cylindrical  
and thread plug gages)



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### DAGER "VERSATILE" DRILL JIG USEFUL SET-UP DEVICE

A unique drill jig has recently been introduced to the metal-working field; it has a wide range of application in the setting up and drilling of either individual or production parts, and, due to its simple, rapid adjustment, the drill jig should find wide acceptance in both small and large shops.

The unit is called the "Versatile" Drill Jig. The detailed illustration below helps to clarify the description of the fixture, as follows: the device consists of the jig

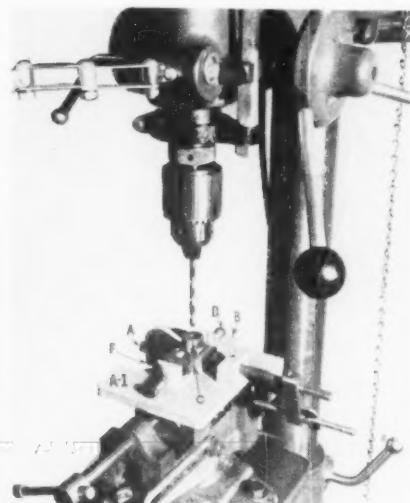


plate (A-1), the aligning screws (A), the positioning screw (B) (not visible in the picture), the drill bushing holder (C), the cross adjustment screws (D), and the lateral adjustment screw (E); this last part is not indicated with an identifying

letter in the picture; one end of it appears as the lower screw just to the right of the drill press column, and to the left of the drill press column lock (with knob). The unit also includes a 2" rule at the left of the device. The semi-circular cutout (F) facilitates the feeding of small parts to within an inch of the drill, or closer if necessary.

The aligning screws (A) are for the purpose of "squaring" the jig plate in relation to the fixed vise jaw. The screw (B) (out of sight below the back edge of the jig plate) is for positioning the jig plate so that zero on the 2" rule is approximately over the edge of the fixed vise jaw. The screws (D) are used in making finer adjustments of the position of the drill bushing after one or more test holes have been drilled. The screw (E) (see above) provides a long range of lateral adjustment in relation to the length of the pieces to be drilled.

The "Versatile" Drill Jig has been found to be so useful and economical that it is being placed on the market. For complete data and specifications on this ingenious device, write: **The Dager Maniferm Co., Dept. BB, 109 W. Washington Blvd., Los Angeles 15, Calif.**

*Be Specific*

*Specify ACE*



**DRILL JIG  
BUSHINGS**

AND GET THE BEST  
Over One-Half Million in Stock  
Write for New Catalog and  
Discount Sheet.

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## THE MULTIFORM BENDER

PRODUCES — Springs, Stampings,  
Wire Forms, Brackets, Bus Bars,  
Clamps, etc. AT A PROFIT.

No Special Tooling

**J. A. RICHARDS CO. KALAMAZOO MICHIGAN**

**KIPP**  
*Air Grinders*

- FASTER SPEEDS
- BETTER RESULTS
- LOW PRICES

MODEL JA  
50,000 R.P.M.

Weight 12 ounces; length  
6 $\frac{3}{4}$  inches; chuck size  
1/8 inch. Wheel guard re-  
moved for better illustration.

\$42  
IN U.S.A.

### THEY GRIND—NOT JUST RUB!

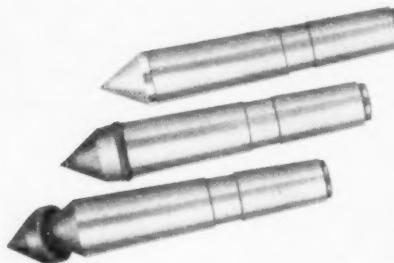
The RPM's stay up while grinding... not only when the grinder runs idle. It is an established fact that surface speeds must stay up to approximately a minute if you want to grind... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

**MADISON-KIPP CORP.**  
207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog AT 3006

### LATHE CENTERS SALVAGED WITH COLMONOY TIPS

With the advent of Colmonoy wear resistant tips, it is no longer necessary to scrap lathe or grinder centers when they are worn back too far for further grinding. The Colmonoy tip or cap can be easily silver soldered to the wear end of the center, facilitating indefinite use for years, by merely retipping when necessary.



Even more important, these Colmonoy tips are said to wear at least seven times longer between grinding than high speed steel. Further, the total cost for reclaiming worn out centers is far less than buying a new high speed steel one.

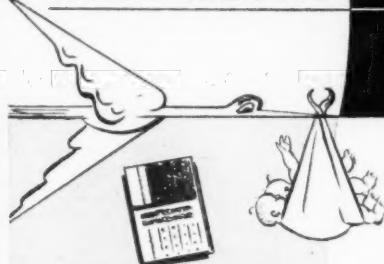
These tips are now available in their cast form, or already applied to standard size centers and finished ground. For complete information write Diamonds and Tools, Inc., Division of Wall Colmonoy Corporation, 19345 John R. Street, Detroit 3, Michigan.



**Remove burrs!  
Chamfer holes!**  
**NOBUR TOOLS**

Industry's unmatched tool for  
**FAST, COST-REDUCING  
PRODUCTION**  
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## **TWIN PRODUCTS**



**WRITE FOR NEW CATALOG  
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**LARGEST RANGE OF SIZES IN  
VELVET-FINISH, PRECISION  
GROUND FLAT STOCK, THREE  
KINDS: WATERCRAT, OILCRAT AND  
AIRCRAT.**

## **DOWEL PINS DRILL RODS**

**JUST ARRIVED AT...**

### **MARSHALL STEEL CO.**

*Companion Items to Ground Flat Stock*

Now available in the finest high-grade steel,  
produced with the same precision-ground quality  
that has always passed extremely rigid inspection.

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#### **NEW CLAMP IDEAL FOR WOOD, METAL, PLASTIC**

The latest model Naper Clamp was evidently designed by one who recognized the possibilities in a clamp to increase productivity and profits for management as well as the "take home" for operators.

The Naper Clamp locks mechanically. When setting up, the clamping bar is brought to rest on the operation, then locked. A series of teeth on a cam is turned to mesh with the serrations on the locking post (it locks at any height from 3 16" to 4"). From then, each operation is locked by the cam clamp handle. A slight, easy movement of this handle is all that is necessary. Released, a spring opens the clamp 3 16" instantly for easy unloading and reloading.

The clamping bar moves in a straight line which eliminates any tendency to push the operation away from the locating stops. With the work held securely against personal injury and spoiling the job, the operator accelerates with confidence, thus increasing his productivity.

The standard Naper Clamp has a capacity of 4". The clamping bar holds operations securely at any point of contact.

When operating with a template, the large, sturdy locking post in the clamp provides convenient and safe handles which can be placed to give the operator full control, at a safe distance, as he guides his work.



The Naper Clamp has fifteen parts; each designed with safety factors; alloy steel; accurately machined; hardened and cadmium plated. In the standard unit, the clamping bar measures 4" x 2" x 7/8"; the locking post, 4½" x 1". **The Naper Clamp Co., Division Illinois Broach & Machine Co., Naperville, Ill.**

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DRILLING

Use a **SAFEWAY** and  
bore holes up to 2 inches  
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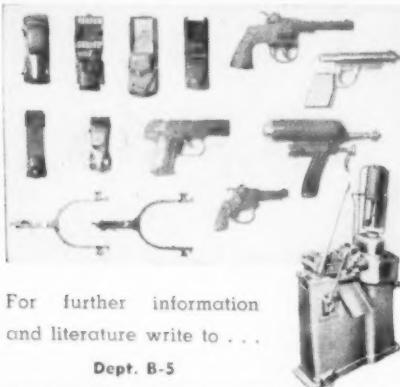
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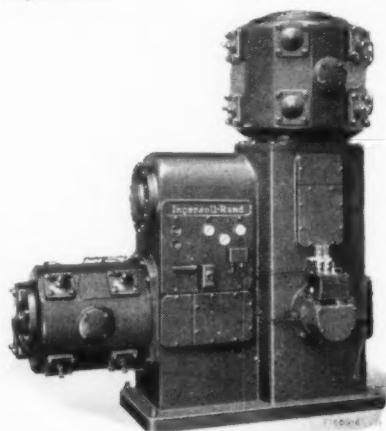
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**DCMT DIE CASTING MACHINE CORP.**  
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### NEW I-R AIR COMPRESSOR

A new idea in air-compressor design is incorporated in a new line of packaged-type, heavy-duty electric-driven compressors announced by Ingersoll-Rand. Sizes range from 125 to 350 h.p. for continuous full-load service and two-stage compression to 80-125 p.s.i. discharge pressure. The manufacturer stresses simplicity of design, operation, and maintenance, as well as operating economy and compactness.



Designated as the XLE, this new L design embodies a single vertical low-pressure compressor cylinder, a horizontal high-pressure cylinder, and a synchronous motor mounted directly on the crankshaft. It requires only a very small foundation, and is engineered full of new ideas from the inside out.

One innovation is "Pipeless, Thru-Frame Air Flow." The air enters and leaves the compressor through main air connections on the frame, instead of on the cylinders, and is led to and from both cylinders and intercooler through large passages within the frame itself. There is no interstage piping nor cylinder strain due to air piping. The intercooler is of a packaged design requiring only one-fourth the space of conventional coolers and fits entirely within the same frame.

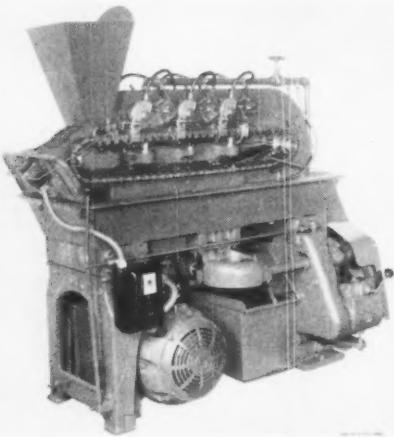
Counterflow, tube-and-finned construction of the intercooler is said to give excellent cooling with very little pressure loss and a small quantity of water. It is made of all-copper alloy throughout. The channel-valve type compressor valves are of a new design, developed specially for high efficiency and long life under XLE service conditions.

All bearings are full-floating and rotate freely both on the bearing journal and within the rod or bearing housing. Main and crankpin bearings are of aluminum alloy. Combined with pressure lubrication in a sealed, dust-tight crankcase that need not be opened for bearing adjustment, this construction is said to result in cool-running bearings, long trouble-free service, and less maintenance.

For additional information write Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

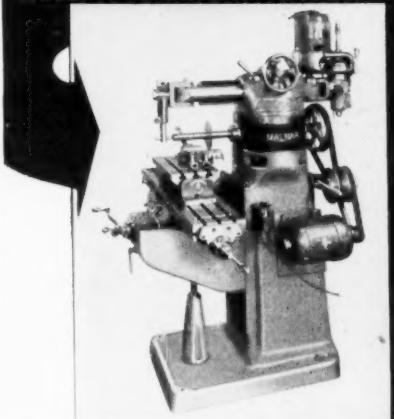
#### PELLOW MACHINE PERFORMS SLOTTING AND MILLING OPERATIONS

The new Duplex Continuous Slotting and Milling Machine, illustrated below, is a revised and reconstructed edition of the Nut Slotting Machine previously offered by the manufacturers, The Pellow Machine Co. As a result of some dimensional changes in the machine and the development of new fixtures and tools, the machine is now able to perform a variety of slotting and milling functions, including the milling of squares and hexes.



Three cutting heads are located over each of the two conveyors, resulting in two separate production units, each of which can operate on a separate part. Provision is made for indexing the work between each cutting station. The production rates that apply in No. 1112 steel are 3,000 pieces per hour in diameters less than 1", larger diameters 2,000 pieces per hour. For further data, write Pellow Machine Co., 13500 Foley Ave., Detroit 27, Mich.

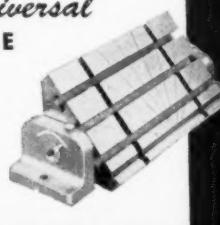
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MACHINE & TOOL CO., INC.  
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## CAN YOU ANSWER THIS FILE QUIZ?

by Herman Reichardt, Consulting Engineer

Count ten points for each question answered correctly. 90 to 100 is excellent and you can file to the head of the class; 80 to 90 is very good; 70 to 80 is good; 60 to 70 is fair; below 60 . . . file the answers to this quiz for future study.

1. The tang of a file is the: **cutting edge; the part that fits into the handle; bevel of the cutting tip;**
2. A mill file is: **round; triangular; or flat;**
3. A pillar file is: **smaller; larger; or same size;** \_\_\_\_\_ as square file.
4. A crossing file is: **half round; curved both sides; or one side flat;** \_\_\_\_\_
5. The bastard cut file has: **22; 32; or 42;** \_\_\_\_\_ teeth per inch.
6. The No. 3 Grobet Swiss file has about **80; 100; or 120;** \_\_\_\_\_ teeth per inch.
7. An American made number 6 file averages: **35 to 60; 90 to 120; or 160 to 200;** \_\_\_\_\_ teeth per inch.
8. An equalizing file has: **straight edges; round; or slightly curved;** \_\_\_\_\_ edges.
9. The term floats indicates: **finish cut; bastard file; or coarse single cut file;** \_\_\_\_\_
10. Over cut indicates: **fine cut teeth; roughing teeth; first series of teeth cut on file;** \_\_\_\_\_

Answers to Quiz on Page 206.

### NEW PRECISION "T" SLOT BOLT HAS UNIQUE ADVANTAGES

Designed and manufactured to overcome traditional shortcomings, the new patented Crayton T-Slot Bolt is made to Machine Tool Builders standards.

To meet the high strength requirements of the service in which they are used, Crayton T-Slot Bolts are forged from Timkin (S.A.E. 4140) Steel, machined to

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UNIVERSAL 3 JAW CHUCKS  
2 SETS OF JAWS

Size	Our Bargain Price
4"	\$25.00
5"	27.00
6"	32.00
8"	39.00
10"	60.00

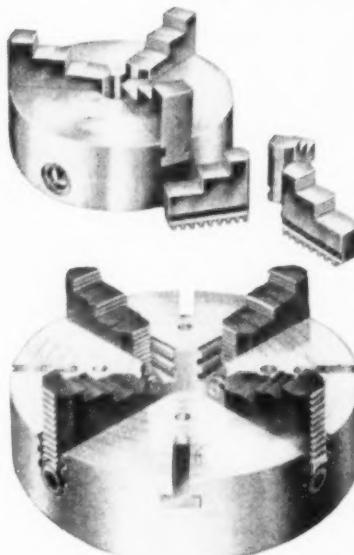
INDEPENDENT 4 JAW CHUCKS  
SOLID REVERSIBLE JAWS

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8"	33.00
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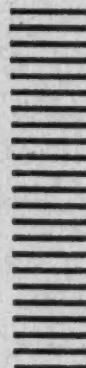
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bolt. Each bolt is stamped with diameter and length for the convenience of the user. Crayton bolts are economical to use because of their low initial cost, increased life and their timesaving features.

Complete information on these T-Slot Bolts may be obtained by writing to T. M. Crayton, Philadelphia 42, Pa.

#### ARE YOU A GOOD INSPECTOR?

Answers to Quiz from Page 124.

1. Graduated
2. Go
3. Spacing
4. Plug
5. External
6. Frame
7. Length
8. Setting
9. Taper
10. Ring

May, 1950



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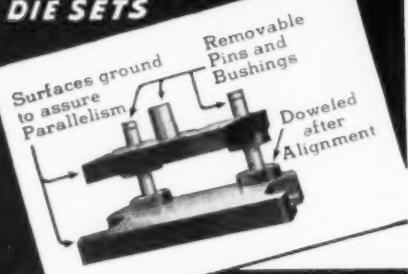
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DIE SETS

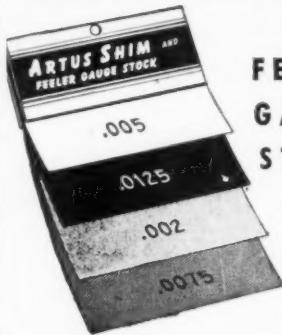


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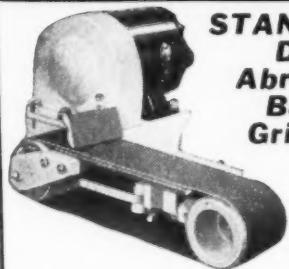
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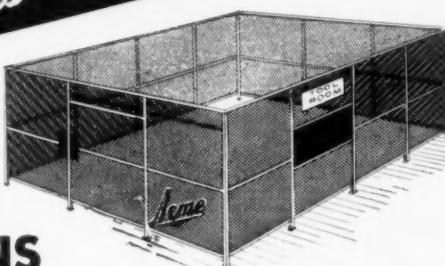
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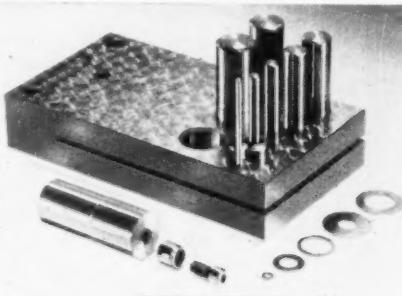
Detroit 7, Mich.

### 28 WASHER COMBINATIONS WITH NEW DIE SET

A versatile Shim and Washer Die Set for fabricating die shims, washers, and gaskets in steel, plastic, mica, rubber, etc. has recently been placed on the market by Davis & Larrick Mfg. Co. This handy kit is a highly efficient unit for hole piercing operations in a variety of substances; it is of particular use to electricians, millwrights, sheet metal workers, experimental laboratories, and similar jobs. It is claimed to solve the problem for tool and die makers for piercing not only the thinnest shim stock, but also material up to and including  $\frac{1}{16}$ " mild steel without burring. The die set is made of high grade tool steel, hardened and drawn to withstand shock without breakage. It is a useful item to the outside service man as well as those in the shop.

Two sets are available. Set No. 1 measures 7" long, 4" wide,  $1\frac{3}{8}$ " thick for die dimensions; the throat has a  $1\frac{1}{8}$ " spread,  $5\frac{1}{2}$ " depth; eight punch sizes, ranging from  $3\frac{1}{16}$ " up to and including  $\frac{1}{16}$ " are available, with three pilot sets of

$\frac{3}{8}$ ",  $\frac{1}{2}$ " and  $\frac{5}{8}$ ". Set No. 2 has same die and throat dimensions as No. 1; eight punch sizes, covering the "odd" increments in  $1/16$ ths up to and including 1" ( $3\frac{1}{16}$ ",  $5\frac{1}{16}$ ",  $7\frac{1}{16}$ " etc.). Three pilot sets are supplied of  $5\frac{1}{16}$ ",  $7\frac{1}{16}$ " and  $9\frac{1}{16}$ ".



For complete data on this Shim and Washer Die Set, write **Davis & Larrick Mfg. Co.**, Box 191, Route No. 2, Dayton 10, Ohio.

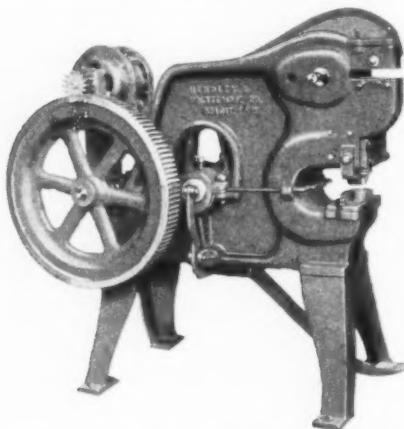
### BELoit COMBINED POWER PUNCHES AND SHEARS

A new line of combined Power Punches and Shears has recently been introduced by Hendley & Whittemore Co. These units are built in seven sizes, with a variation in stroke of from  $\frac{3}{4}$ " to  $1\frac{3}{8}$ ", a shearing capacity in round stock of from  $\frac{7}{8}$ " on the Model 51 to one of  $2\frac{1}{4}$ " on the Model 56. Throat depths vary from 5" to 12" in the units. Other specifications differ in like proportion.

The Model 54, illustrated below, is of the plain jaw type; it has an 8" throat

The frames are one-piece castings, the metal being located where it is needed, thus giving the greatest strength and the necessary weight at the points subject to the greatest strain. The levers are planed to size, and fitted to the body. The 4-jaw clutch provides for an engagement at every quarter turn of the main gear, an important feature, since it accelerates production speeds. The gears are cut from machine cut metal patterns in order to give greater strength and resistance to wear, combined with smooth, quiet operation.

Architectural jaw type machines are also available upon request. These units have the overhanging type jaw for punching into the legs of channels and other structurals. The machines are regularly furnished with plain jaw, and with tight and loose pulleys for belt drive. For complete specifications and capacities, send for 4-page Bulletin No. 10 to **Hendley & Whittemore Co.**, 100 Blackhawk Blvd., Beloit, Wis.



depth, a capacity punch of  $\frac{3}{4}$ " through  $\frac{3}{4}$ "; a capacity shear in flat bars of  $\frac{3}{4}$ " x 4" or  $\frac{5}{8}$ " x 6". Shearing capacity of rounds is  $1\frac{1}{2}$ "; of angles,  $\frac{3}{8}$ " x 3". The gap height is  $6\frac{1}{2}$ "; stroke is 6". The required power for this machine is a 5 h.p., 1800 r.p.m. motor.

All cast parts of these combined power punches and shears are of semi-steel or cast steel, whichever is necessary to give required strength and wearing qualities.

### BRIDGEPORT NO-STRIP SLOT NUTS

A line of rugged No-Strip Slot Nuts made of a special aluminum bronze alloy in eight different sizes has been introduced by Hardware Manufacturing Co., Bridgeport makers of a wide variety of set-up tools. These slot nuts have been adopted as a standard stock item by many leading manufacturing firms. It is claimed by the fabricators that these bronze alloy slot nuts will outlast steel slot nuts 4 to 1.

Threads are guaranteed not to strip or pull. They will not chip the "T" slots of the machine table. Studs will not bind in the threads of these slot nuts, the manufacturers claim. The sizes of the Bridgeport No-Strip Slot Nuts include five standard sizes to fit studs ranging from  $1\frac{1}{2}$ " to 1", in increments of  $\frac{1}{8}$ ", and



CLOSED

TRADE

Plain Type



CLOSED

MARK



Offset Type

## CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

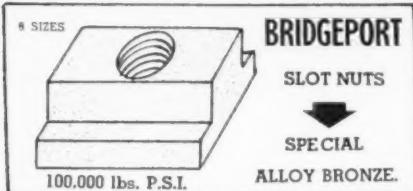
AUTO MOULDING  
& MFG. CO.

1110 E. 87TH ST.  
CHICAGO 19, ILL.

SPECIFICATIONS  
Open width  $\frac{7}{8}$ " to 6"  
Gage Material .040 to .125  
P.i. Diameter .101 to  $\frac{3}{8}$ "  
Lengths to 120"

SEMI-OFFSET

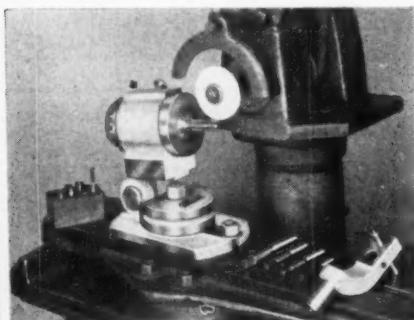
three special sizes, consisting of  $\frac{7}{8}$ " slot nuts for  $\frac{3}{4}$ " studs, 1" nuts for  $\frac{7}{8}$ " studs, and 1" nuts for  $\frac{3}{4}$ " studs. A sample of the



No-Strip Slot Nuts is available for trial use, free of charge. For details write Hardware Manufacturing Co., 1969 North Ave., Bridgeport 4, Conn.

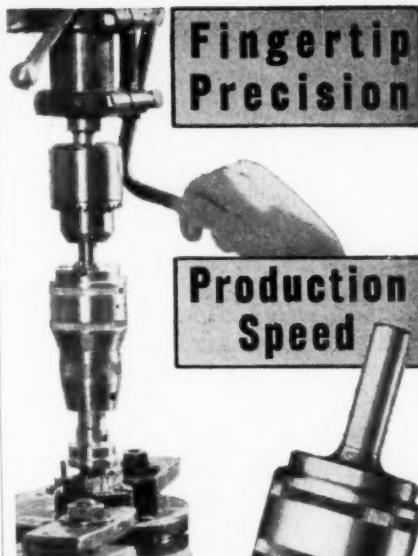
#### UNIVERSAL DIVIDING COLLET HEAD

Center Tool & Manufacturing Co., Chicago makers of tools, dies, jigs and fixtures, gages, templets, etc., have just introduced their new Universal Dividing Collet Head. This useful device is provided with a sturdy graduated swivel base, and can be set in a  $90^{\circ}$  vertical position. It is stated to be particularly use-



ful for sharpening most types of milling cutters. It is also adapted for grinding tapers, angles, hexagons, etc. on a surface grinder. The unit is provided with an attachment for accurate angle dressing on a surface grinder wheel. A drilling attachment enables angular precision drilling to be accomplished.

Special features of the Universal Dividing Collet Head include a hardened and ground spindle; the device is sealed for complete protection against dust and dirt. It uses a standard 5C collet (up to 1" capacity). Minute Vernier index plates range from 2 to 36T. For complete data on this serviceable unit, write **Center Tool & Manufacturing Co.** 2706 W. Van Buren St., Chicago 12, Ill.



Saves costly preparation time — precision grooving of single or multiple grooves at a production rate — low initial cost, has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

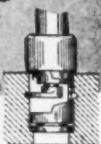
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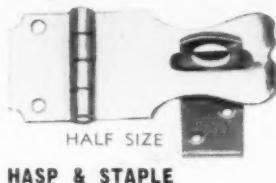
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**WORCESTER 3, MASS.**

Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.



SINGLE GROOVE LOCATED FROM TOP OF HOLE



**WITH OR WITHOUT HOLES**

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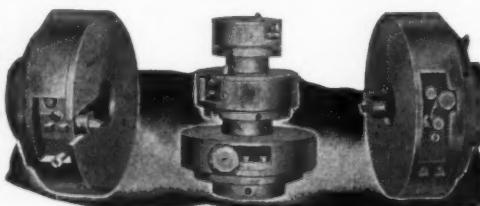
Regrind your worn tools to original forms . . . at low cost with the fully universal cutter grinding fixture which can be used on ANY make of universal tool or surface grinder. Base graduated in 180° . . . spindle housing in 360°. Has features not found in much higher priced machines. Begin now to enjoy the time saving and cost cutting advantages which only the Universal can give you. Order today. Fully descriptive literature on request.

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**MUMMERT-DIXON  
FACING HEADS  
with Automatic Feed**

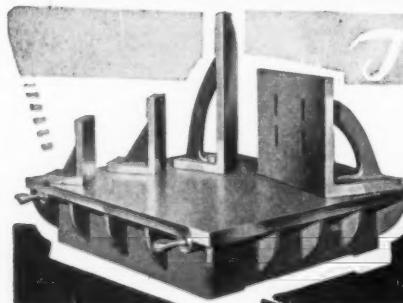
One-way Tool Feed — 6, 9 and 12" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

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Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

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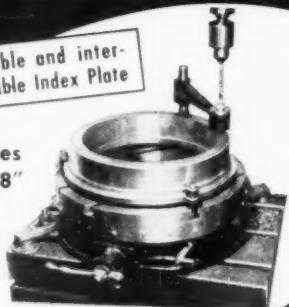
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**BALL BEARING INDEXING TABLE**

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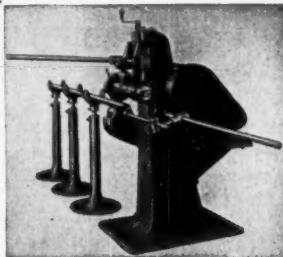
Three Sizes  
12"-15"-18"



See your dealer or write  
for Catalog No. 14

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Cincinnati 9, Ohio, U.S.A.



*Faster* **TUBE & PIPE**

**CUTTING**

Steen High-Speed pipe, tube and column cut-off machines embody unique design and rigid construction features to greatly step up cut-off operations. Available in three sizes to cut diameters  $\frac{1}{8}$ " to 3";  $\frac{1}{8}$ " to 6"; 3" to 12".

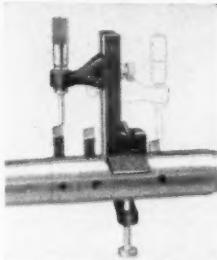
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**RECESSING TOOLS**  
GROOVING—RECESSING—BACKFACING



MAXWELL offers the finest line of recessing tools available at any price. Capacities range up to 4". Interchangeable shanks adapt these versatile tools to any drill press, boring mill, turret lathe, automatic, milling machine, etc. Gear and rack operating mechanism guarantees absolute accuracy. Quality tool steel construction assures long service life.

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**SAVE 90%  
CHECKING TIME  
WHEN BUILDING DIES**

This new method of checking tapers on dies does away with die squares and height gauges.

Write for complete details.

**Tietzmann Tool Corp.**  
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**CARROLL  
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3 SIZES - 4 MODELS - 6" to 12"  
**TROYKE MFG. CO.**  
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**STOP DUST**

**DUSTKOPS**

UNIT TYPE  
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**20 Models**

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For: Grinders, buffers, polishers,  
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1/2 x 2"	\$ .40	ea.
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5/8 x 2"	.48	ea.
5/8 x 3"	.52	ea.
5/8 x 2"	.60	ea.
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Ideal protection for grinders, polishers, buffers. Easy breathing. 40 sq. in. filter area. Weighs only 4 oz. U.S.B.M. approved for type "A" dusts. Sample \$2.50 p.p.

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GENERATED WITH PRECISION ON  
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**BLOOMFIELD TOOL CORP.**  
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## NORTON PORTABLE GRINDER WHEEL HAS REINFORCED HUB

The Norton Reinforced Hub Wheel for portable grinders is a new addition to the complete line of abrasive products manufactured by Norton Company. This wheel is designed for use on right angle portable grinders and disc sanders primarily in weld grinding and foundry operations. It has been designed to combine strength, safety, and durability with a fast rate of cut.



In construction, this wheel is reinforced with layers of strong fibrous material between the layers of Alundum abrasive grain and resinoid bond. In addition, the wheel has a strong composition safety web molded onto the back, serving to hold the wheel together in the event of accidental breakage until the machine can be stopped and the wheel removed.

Some specific uses of the new Norton reinforced Hub Wheel include scarfing and beveling preparatory to welding; cutting away, smoothing, and blending welds in steel tubular frames, machine guards, tanks and other fabricated work; remov-

ing burrs and sharp edges from steel sheets and plates; cutting off gates and risers on brass, bronze, and aluminum castings; nicking and notching large gates and risers on all kinds of castings preliminary to breaking them off; removing mold marks and cleaning castings; smoothing flame-cut edges on heavy steel plates; and many similar operations.

For complete information on the new Reinforced Hub Wheel, write **Norton Company**, 1 New Bond St., Worcester 6, Mass.

**SAVE DOWN-TIME ON DIES**  
**"Industrial"**  
**COMPENSATING**  
**SPACERS**

For quick-easy adjustment on  
 strippers, pressure pads, etc.  
 Fit shoulder and standard  
 screws. Precision made of hard-  
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**PRICES per 100 f.o.b. CHICAGO**

Size	ID	OD	Thickness
3/4	.750	1.000	1/32"
5/8	.625	.875	1.43
1/2	.500	.750	1.08
7/8	.375	.562	.87

**600 Assorted and Indexed on \$7.85**  
 8" x 8" Metal Wall Rack

**PROMPT SHIPMENT**  
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## Save time . . . Money . . . Instant stock check-up **"INDUSTRIAL" DRILL ROD RACKS**

Pick sizes and lengths instantly. Save waste. Fast selection of long or short pieces. Fully indexed in Numbers, Fractions and Decimals. Durable all steel V-slot construction.

NUMBER SIZE — Holds 8 to 10 each of Rods from 1 thru 60, and 3" to 36" lengths 54".  
 Long x 30" High. **\$25.00**  
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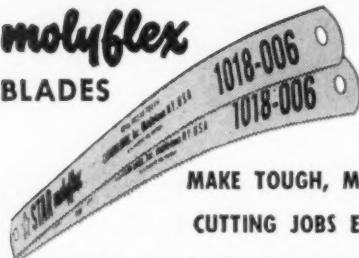
FRACTIONAL SIZE — Holds 5 to 10 each of rods 1/32" thru 17/32" by 64ths. Fractional and Decimal Index. 46".  
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## molyflex

### BLADES



MAKE TOUGH, METAL  
CUTTING JOBS EASY!

Here's the blade that will help you cut costs . . . speed up tough metal cutting jobs. These new "Molyflex" High Speed Hand Hack Saw Blades combine the ability to cut the hardest materials with a toughness and resistance to breakage that is unsurpassed. They're shatter-proof too!

In recent tests, when pitted against eight leading competitive blades in cutting SAE 52100 ball bearing steel . . . STAR'S new "Molyflex" AVERAGED 23.8% MORE METAL CUT than all the leading brands tested!



### STAR STEELRITE METAL MARKING CRAYONS

Ask your STAR distributor about these new and improved metal marking crayons. Available in a variety of sizes, these crayons, made of genuine soapstone by special extrusion process, are uniform in strength and composition. Markings can be made on hot, cold, damp or grimy metal and withstand pickling, yet do not affect enamel application.

Get your free copy of STAR'S "Metal Cutting" Booklet and the STAR Wall Chart for your shop! Both are packed full of useful information and will help you get maximum results from hand, hand and power hack saw blades.



### CLEMSON BROS. INC.

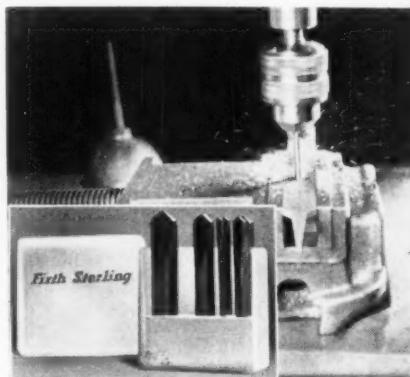
MIDDLETOWN, NEW YORK

Manufacturers of Hand and Power Hack Saw Blades and Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines.

### FIRTHITE HARD-METAL DRILL KITS

Firth Sterling Steel & Carbide Corporation announces the development of a new Firthite Drill, which has been designed especially for the drilling of metals up to 66 Rockwell C Hardness. For example, the new drill will penetrate materials of a hardness equal to that of high speed tool bits, hardened steel files or the softer grades of carbide.

Firthite Drills are ground from solid Firthite (sintered carbide) cylinders



They are pointed and relieved for free cutting, and are alleged to produce an excellent finish without discoloring or drawing the temper of the material being drilled.

Firthite Drills are stocked in sizes  $\frac{3}{16}$ ",  $\frac{1}{4}$ ",  $\frac{5}{16}$ ",  $\frac{3}{8}$ " and  $\frac{1}{2}$ ", and package in complete sets of six in new, pocket size kits. Complete data is available upon request from Firth Sterling Steel & Carbide Corp., Dept. BB, McKeesport, Pa.

### MAGNETIC BIT HOLDER FOR SCREW DRIVERS

A new magnetic bit holder for Kell pneumatic screw drivers, recently developed by Keller Tool Company, not only keeps bits in place by magnetic attraction, but holds the screws in position for driving.



The new holder is an Alnico permanent-type magnet, set in a nickel st case. It was developed to speed up screw driving time, especially in recessed areas and to eliminate tedious positioning

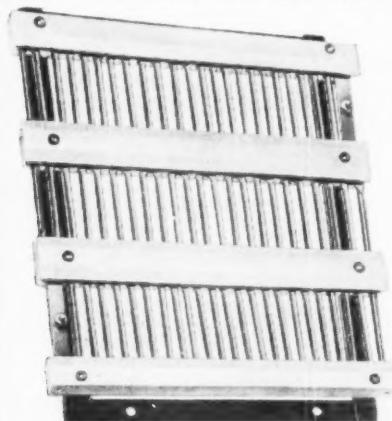
screws with the fingers, since the magnet's attraction holds screws firmly at the bit end of the tool.

Insert bits of the  $\frac{1}{4}$ " hex type may be used with the new magnetic bit holder. Phillips, Frearson, and other screws which do not require use of a finder, are normally driven with this type of bit. Bits are quickly interchangeable by pulling one out of the holder and replacing it with another.

The Keller Magnetic Bit Holder is available in three driving arrangements for use with rotary screw drivers: straight drive, positive clutch, and cushion clutch. A magnetic holder is also available for some Keller screw drivers. For complete information on this useful new tool, write the manufacturer: **Keller Tool Co.**, Dept. BB, Grand Haven, Mich.

#### ELECTRIC HEATING ELEMENTS IN NEW STANDARD SIZE RACKS

Versatility in application, ease of installation and economy of operation are among the advantages provided by these new standard-size heating element racks. The racks can be arranged horizontally or vertically, in all types of equipment, to supply from 1.5 KW to 300 KW. Construction comprises patented "folded-and-formed" continuous ribbon type elements



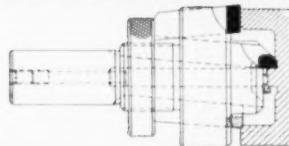
located in high temperature refractory porcelains, supported on steel or stainless steel frames, 12" square. Racks are drilled for mounting.

These new "folded-and-formed" heating element racks carry a five year guarantee either at temperatures of up to 750° F. in still or moving air or 1350° F. For complete description, write for Bulletin 80-T. to **Trent, Inc.**, 5011 Wilde St., Philadelphia 27, Pa.

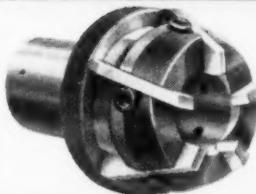
May, 1950

# GENESEE

## COST CUTTING MULTIPLE OPERATION TOOLS



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STD. 0-2"  
CAPACITIES  
H.S.S. or  
T.C.T. BLADES  
10 STYLES

### ADJUSTABLE HOLLOW MILLS



### FACING AND COUNTERBORING TOOLS

Let our Engineering Dept. solve your Production Tool problems. Over 40 years of Know How at your disposal.

Write for Catalog 48-H

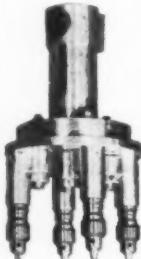
**GENESEE MFG. CO., INC.**  
**ROCHESTER 4, N. Y.**

- ADJUSTABLE HOLLOW MILLS
- FACING AND COUNTERBORING TOOLS
- SPECIAL PRODUCTION TOOLS

# SELLIW

## CLUSTER ADJUSTABLE FULL BALL BEARING DRILL HEAD

This type of adjustable head can drill holes in circular, straight line or staggered formation. The minimum circle obtainable with this No. 1 AC size is 2", maximum circle obtainable 7". When head is furnished with drill chucks, largest size drill,  $\frac{3}{8}$ ", when furnished with taper holes in the spindles, largest drill is 9/16".



Heads of this type are made in larger sizes with No. 2 and No. 3 M.T. holes in the spindles.

Builders and designers of universal joint drill heads.

We also design and build special drill heads, and drilling machines to customer's specifications.

**SELLIW MACHINE TOOL CO.  
(INC. 1910) — PAWTUCKET, R. I.**

### FELL PRECISION LEVELS .0005 INCH PER FOOT



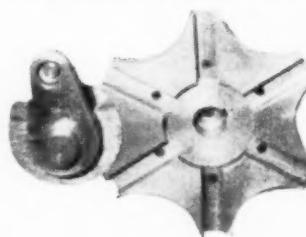
Very Accurate and Dependable All-Way Levels and Plumbs for machinery . . . save time . . . do better work. Made in sizes: 3½" x 6" and 5½" x 12", Plumb Level: 5" x 5" x 12", Levels for permanent mounting: 4" and 5" diameter with adjustment.

Assure the accuracy of your machines with Built-in Fell Precision Levels.

Write for full information.

**WM. B. FELL COMPANY**  
320 McLain Ave. Rockford, Ill.

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INDEXING?  
USE A GENEVA!**



**4-5-6-7-8 POINTS                    60 SIZES  
3" to 5¾" CENTER DISTANCE**

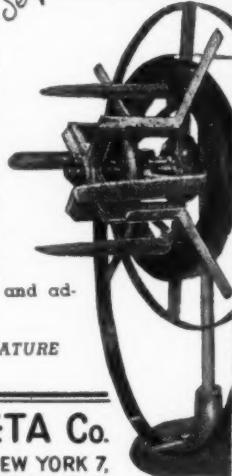
**WRITE TO:  
GENEVA MACHINE & TOOL CORP.  
TAMPA, FLORIDA**

### WESTLEN *Adjustable Self Centering* REELS

For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.

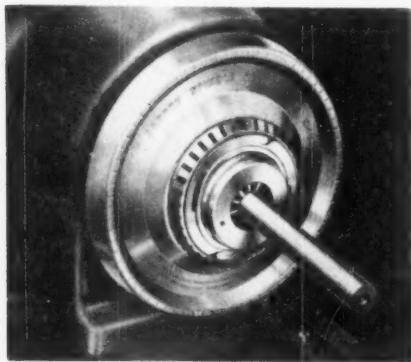
**SEND FOR LITERATURE**

**The RULETA Co.  
27 WARREN ST. NEW YORK 7.**



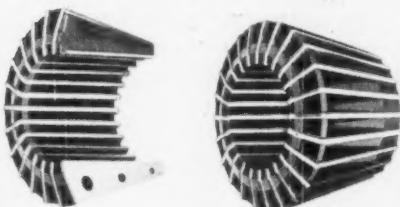
### SPINDLE NOSE LATHE COLLET CHUCK

A lathe collet chuck of radically advanced design, known as the Spindle Nose Lathe Collet Chuck, has been introduced by The Jacobs Mfg. Co. The chuck's unusual accuracy is claimed to be greater than that of any other chuck of its type. Runout at the nose and at points several inches from the nose is said to be much less than for present split steel collet chucks. The chuck provides tremendous



gripping power which has been established as from two to four times the grip of split steel collets—a feature which enables the operator to use the highest speeds and feeds available in modern tool room lathes without danger of slipping or scoring the work.

One important key to the chuck's performance lies in the manufacturer's newly developed Rubber-Flex Collet. Composed of special Hycar synthetic rubber,



bonded and mechanically locked to hardened and ground tool steel jaws, each collet has a full  $1\frac{1}{8}$ " gripping range. On this basis, one Rubber Flex Collet does the work of 8 split steel collets. Only

eleven Rubber-Flex Collets are needed to chuck any bar between  $1\frac{1}{16}$ " and  $1\frac{3}{8}$ ". In contrast, 88 split steel collets graduated by 64ths, 44 graduated by 32nds or, 22 graduated by 16ths are required to cover this same range. These collets eliminate the necessity of purchasing special decimal and millimeter sized collets.

This chuck has also been found to be suitable for woodworking and pattern making, as it develops a very tight grip and it will not score the surface of the stock. Among the unit's assets is the ease with which the work is tightened and loosened in the chuck, holding operator fatigue to a minimum. A special impact mechanism locks the work in place or frees it with a few sharp impacts administered by quickly rotating the handwheel. No draw-in bar, lever or other device is ever needed to lock work in the chuck or to free it. **The Jacobs Manufacturing Co., 30 Jacobs Road, West Hartford 10, Conn.**

Class I railroads installed more new locomotives in service in 1949 than in any similar period in 25 years, there having been 1,865 of which 1,808 were diesel and 57 were steam.

**A REALLY VERSATILE  
ROLL FEED \$129.50**

Quality built for long, dependable service. Models available to fit all size power presses.

Write today for circular and prices.

**ROLL FEEDS CORP.**  
**PAWTUCKET • RHODE ISLAND**



## NEW PORTABLE ELECTRIC LUBRICATOR

A new portable electric lubricating unit, the "Pioneer", has recently been introduced by Louisville Electric Manufacturing Co., Inc. This device features constant pressure in the hose at all times, controlled by an automatic switch. No air or moisture can enter either the hose or the gun, as a result there is always grease to the gun tip. By pressing the



control valve, a 5000-lb. pressure shot of lubricant thoroughly lubricates the bearing. Modern design and sturdy construction assure trouble-free performance, the manufacturers state.

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Specifications include a lubricant capacity of 25 lbs. The delivery is from 9 to 2 ounces per minute under a maximum pressure of 5000 lbs. The unit is 33" high, 8" long, and weighs 79 lbs. For complete information, write Louisville Electric Manufacturing Co., Inc., Dept. BB, Louisville 11, Ky.

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They are part of a series of American Standards for small tools and machine tool elements which have been developed by a technical committee organized under

the procedure of the American Standards Association, and sponsored by the American Society of Mechanical Engineers; Society of Automotive Engineers; National Machine Tool Builders' Association; and the Metal Cutting Tool Institute.

The new American Standard Punch and Die Sets for Two-Post, Punch Press Tools, covers the design and dimensions of back-post sets and diagonal-post sets which are in general demand by tool designers, and are used by die makers for the mounting of punch-press tool details. The types and range of sizes have been selected to meet the largest volume of users' needs and may be manufactured on a continuous production basis.

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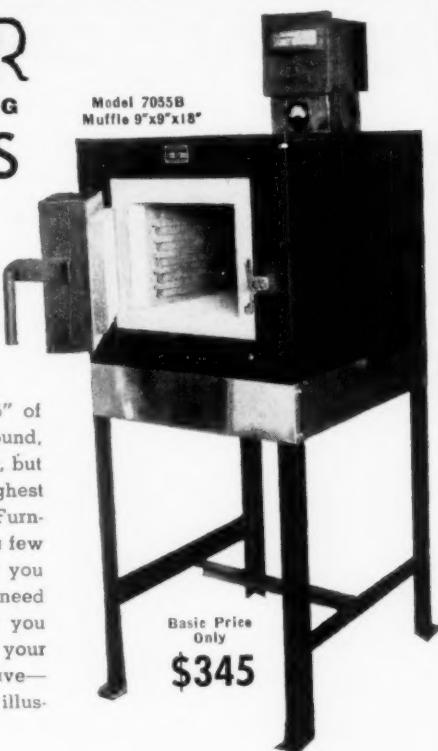


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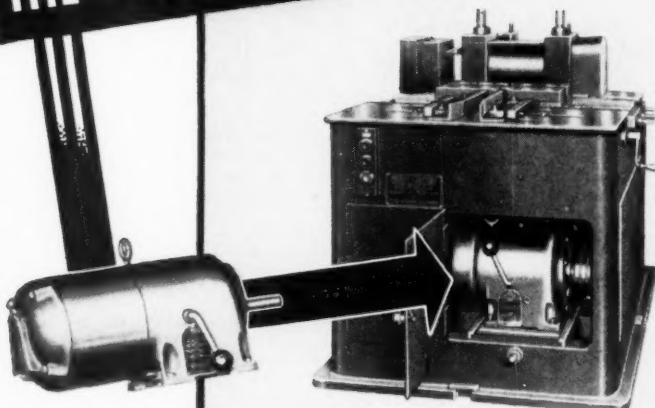
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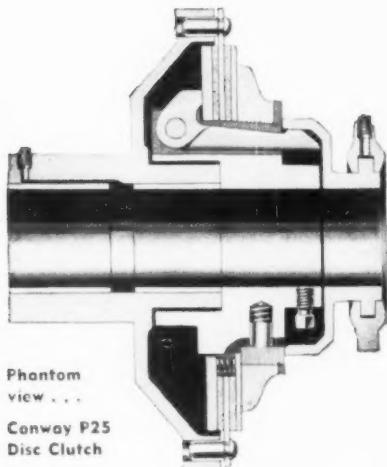
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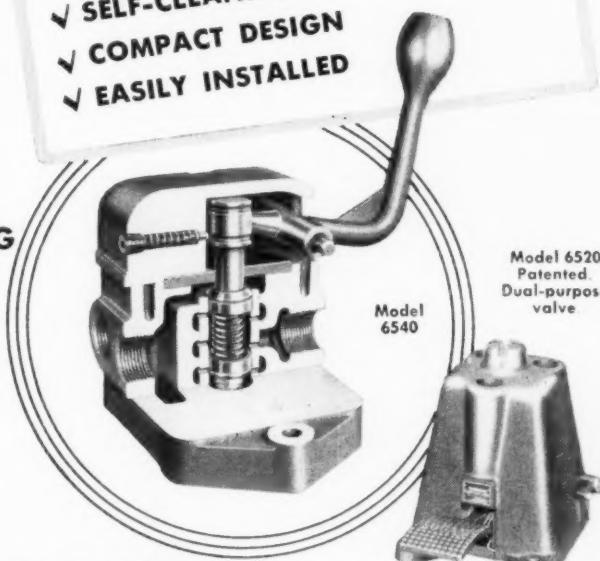
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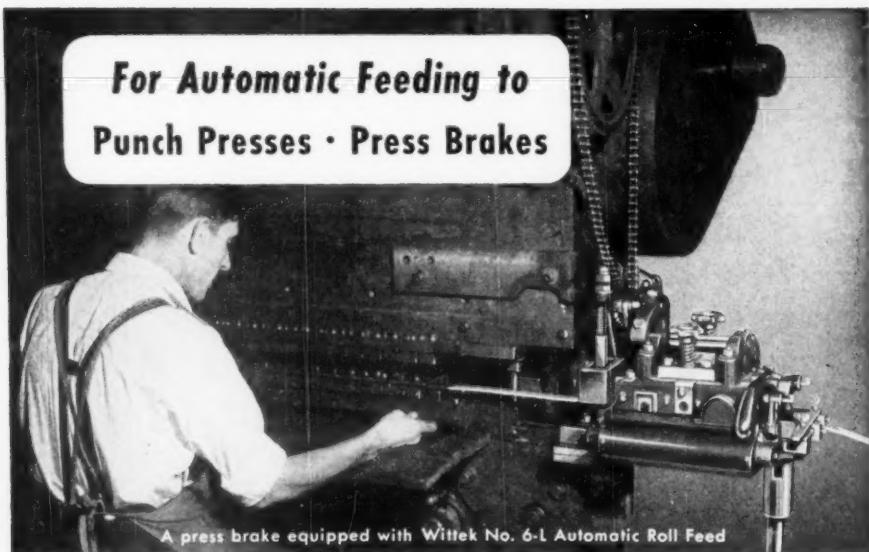
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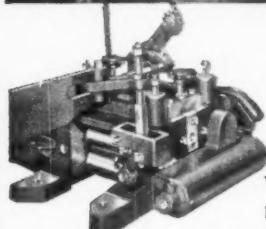
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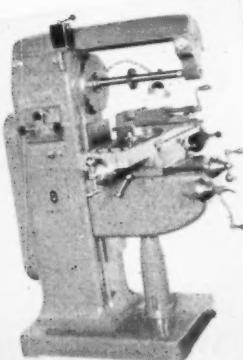
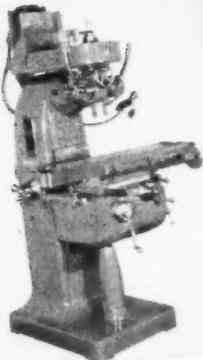
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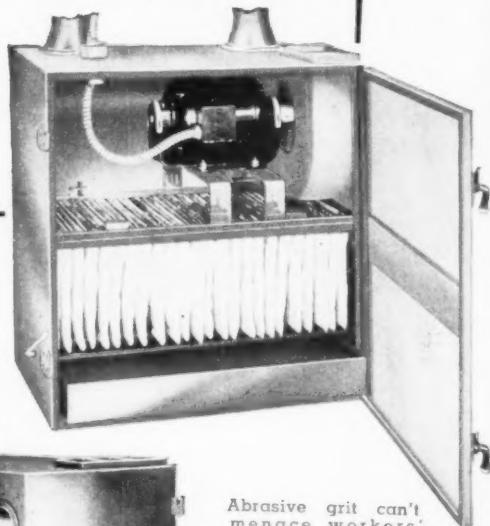
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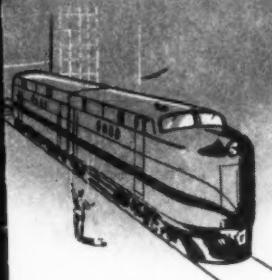
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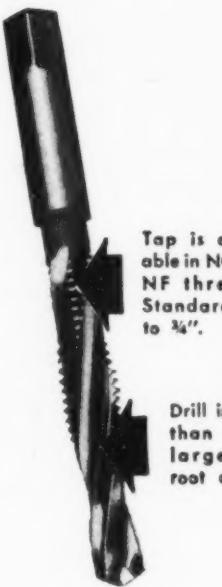
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